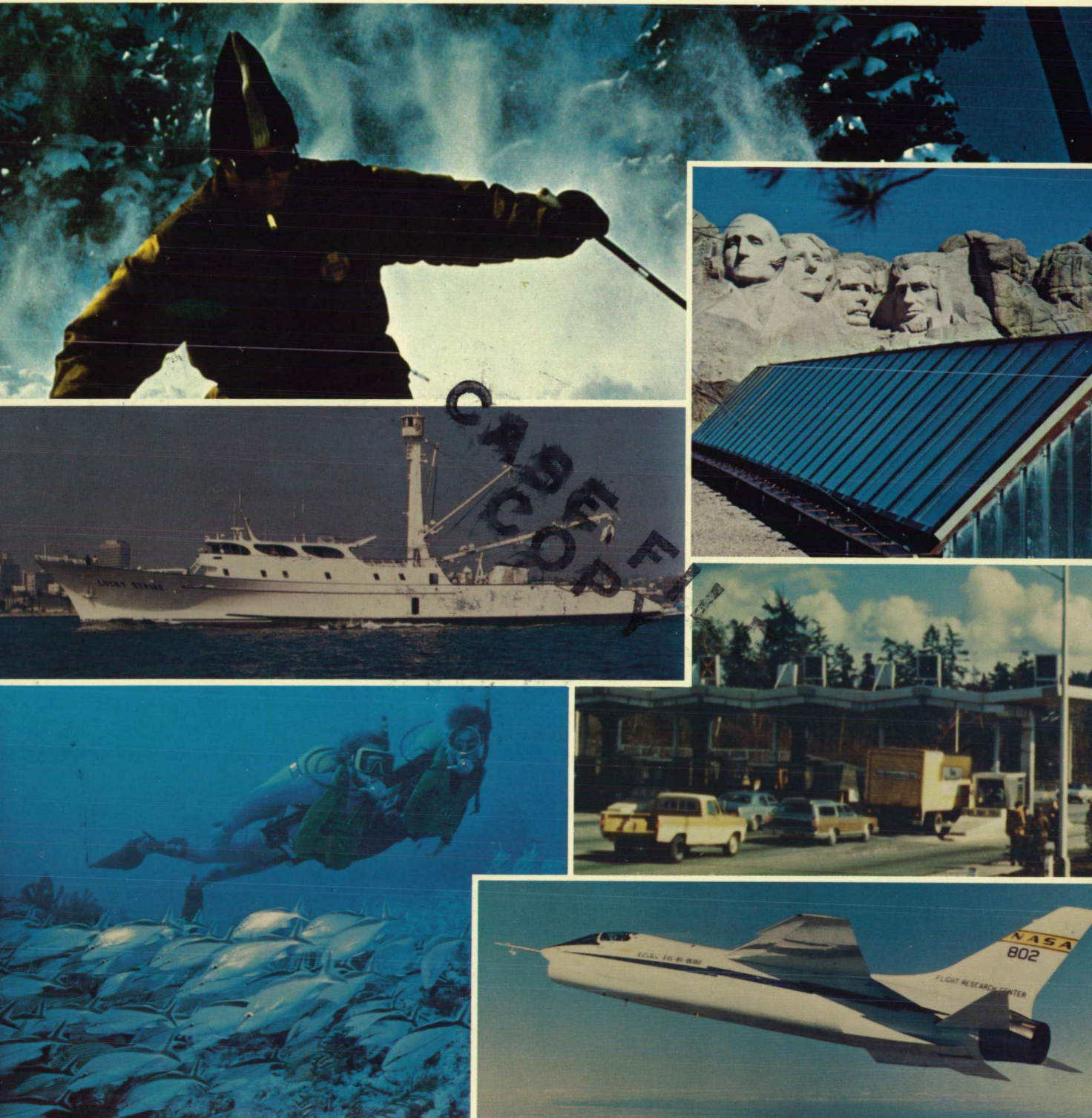


# NASA Tech Briefs

## Index 1978

National  
Aeronautics and  
Space  
Administration



# INTRODUCTION

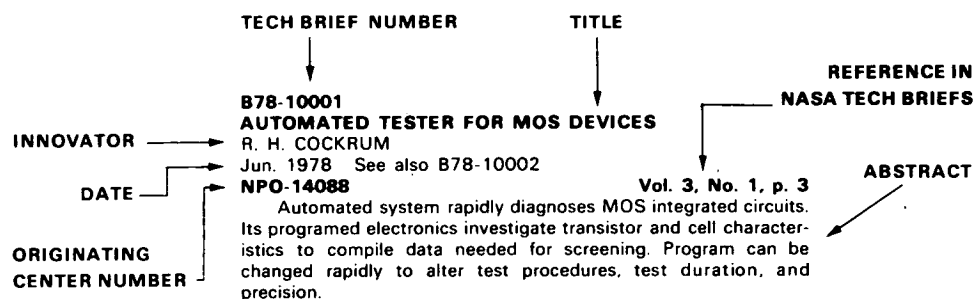
Tech Briefs are short announcements of new technology derived from the research and development activities of the National Aeronautics and Space Administration. These briefs emphasize information considered likely to be transferrable across industrial, regional, or disciplinary lines and are issued to encourage commercial application.

This *Index to NASA Tech Briefs* contains abstracts and four indexes -- subject, personal author, originating Center, and Tech Brief number -- for 1978 Tech Briefs.

## Abstract Section

The abstract section is divided into nine categories: Electronic Components and Circuits; Electronic Systems; Physical Sciences; Materials; Life Sciences; Mechanics; Machinery; Fabrication Technology; and Mathematics and Information Sciences. Within each category, abstracts are arranged sequentially by Tech Brief number.

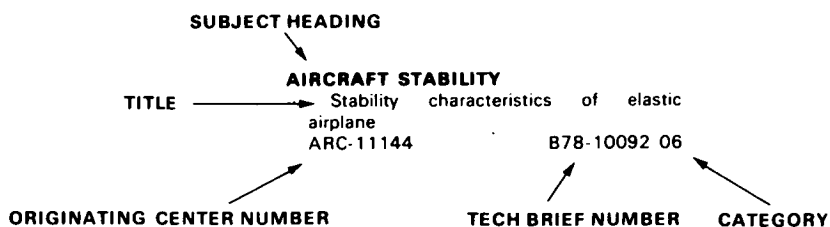
A typical abstract entry has these elements:



The originating Center number in each entry includes an alphabetical prefix that identifies the NASA Center where the Tech Brief originated. A list of prefixes and the corresponding Center names are given on page iii.

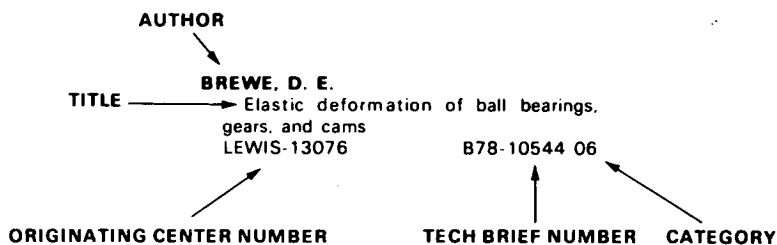
## Indexes

Four indexes are provided. The first is a subject index, arranged alphabetically by subject heading. Each entry in the subject index includes a Tech Brief number and a category number to aid the user in locating pertinent entries in the abstract section.

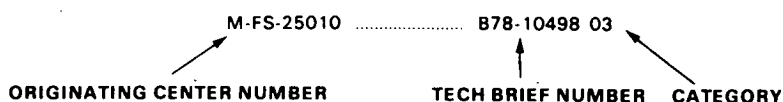


The January 1976 edition of the *NASA Thesaurus* (NASA SP-7050) is used as the authority for the indexing vocabulary that appears in the subject index. The *NASA Thesaurus* should be consulted in examining the current indexing vocabulary, including associated cross-reference structure. Only the subject terms that have been selected to describe the documents abstracted in this issue appear in the subject index. Copies of the *NASA Thesaurus* may be obtained from the National Technical Information Service at \$23.50 for the two-volume set.

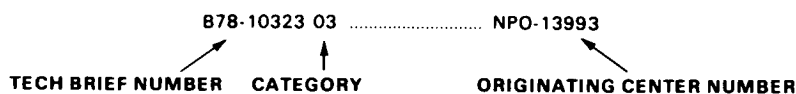
The second index is a personal author index. Entries in this index are arranged alphabetically by author's name. Tech Brief and category numbers are supplied to help the user find the appropriate entries in the abstract section.



The third index relates each originating Center number to the corresponding Tech Brief number and category. Entries in this index are arranged in alphanumeric order by Center number.



The fourth index relates each Tech Brief number to its originating Center number. Entries are arranged in ascending Tech Brief number order.



## Originating Center Prefixes

ARC	Ames Research Center
GSFC	Goddard Space Flight Center
HQ	NASA Headquarters
KSC	Kennedy Space Center
LANGLEY	Langley Research Center
LEWIS	Lewis Research Center
M-FS	Marshall Space Flight Center
MSC	Johnson Space Center (formerly Manned Spacecraft Center)
NPO	Jet Propulsion Laboratory/NASA Pasadena Office



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# Index to NASA Tech Briefs

February 1979

## Abstract Section

### 01 ELECTRONIC COMPONENTS AND CIRCUITS

**B78-10001**

#### **AUTOMATED TESTER FOR MOS DEVICES**

R. H. COCKRUM

Jun. 1978 See also B78-10002

**NPO-14088**

**Vol. 3, No. 1, p. 3**

Automated system rapidly diagnoses MOS integrated circuits. Its programed electronics investigate transistor and cell characteristics to compile data needed for screening. Program can be changed rapidly to alter test procedures, test duration, and precision.

**B78-10002**

#### **MEASURING OXIDE TRAPPING PARAMETERS IN MOS STRUCTURE**

J. MASERJIAN

Jun. 1978 See also B78-10001

**NPO-14120**

**Vol. 3, No. 1, p. 4**

System for controlled injection of electrons or holes into oxide layer of MOS capacitor can be used to measure oxide trapping parameters. Since trapping mechanisms can cause degradation and ultimate failure of MOS elements exposed to ionizing radiation, system can be helpful in predicting device tolerance.

**B78-10003**

#### **NYLON SCREWS MAKE INEXPENSIVE COIL FORMS**

G. AUCCOIN (TRW, Inc.) and C. ROSENTHAL (TRW, Inc.)

Jun. 1978

**MSC-16912**

**Vol. 3, No. 1, p. 5**

Standard nylon screws act as coil form copper wire laid down in spiral thread. Completed coil may be bonded to printed-circuit board. However, it is impossible to tune coil by adjusting spacing between windings, technique sometimes used with air-core coils.

**B78-10004**

#### **GATE-ASSISTED TURN-OFF THYRISTOR**

L. R. LOWRY (Westinghouse Electric Corp.), D. J. PAGE (Westinghouse Electric Corp.), and E. S. SCHLEGEL (Westinghouse Electric Corp.)

Jun. 1978 See also NASA CR-134951 (N77-31405)

**LEWIS-12535**

**Vol. 3, No. 1, p. 6**

1,000-volt, 200-ampere gate-assisted turn-off thyristor has been developed for power circuits requiring high efficiency, small size, and low weight. Design features include shunted cathode for high  $dV/dt$  capability. Cathode is interdigitated with dynamic gate for fast, low-loss switching. Operating frequency exceeds 20 kHz with overall energy dissipation of less than 12 mJ per pulse for

typical 20-microsecond half-sine waveform. Device has turn-on time of 2 microseconds and turn-off time as short as 3 microseconds with only 2 amperes of gate drive.

**B78-10005**

#### **S-BAND COMPLEX-WEIGHT MODULE FOR ADAPTIVE PROCESSING**

A. J. GIANATASIO (Harris Corp.), J. B. SCHAPPACHER (Harris Corp.), D. G. SCOTT (Harris Corp.), and M. R. WILLIAMS (Harris Corp.)

Jun. 1978

**LANGLEY-12197**

**Vol. 3, No. 1, p. 7**

S-band complex weight for adaptive processing is fabricated as microwave integrated circuit. When interfaced with suitable control component, it is potentially capable of producing 25 dB rejection of interface with bandwidth of 500 MHz. Performance improves with decreased bandwidth. Versatility stems from numerous control methods available in broadening field of adaptive processing.

**B78-10006**

#### **ADAPTIVE POLARIZATION SEPARATION EXPERIMENTS**

C. A. BAIRD (Harris Corp.), A. J. GIANATASIO (Harris Corp.), G. M. PELCHAT (Harris Corp.), G. G. RASSWEILER (Harris Corp.), D. G. SCOTT (Harris Corp.), R. F. VARLEY (Harris Corp.), and L. R. YOUNG (Harris Corp.)

Jun. 1978

**LANGLEY-12196**

**Vol. 3, No. 1, p. 8**

Network approach lends itself to simple, direct, analog adaptive control. System constructed and tested successfully with adaptive control yielding residual cross polarization below main channel level for input cross polarization. Canellation network significantly cancels polarization over very wide bandwidths and is adaptively controlled.

**B78-10007**

#### **CURVE TRACER CHECKS CMOS IC'S**

F. KIZER

Jun. 1978

**GSFC-12209**

**Vol. 3, No. 1, p. 9**

Conventional transistor curve tracer can speed up failure analysis of CMOS integrated circuits by displaying transfer characteristics while device is subjected to vibration or environmental testing. Failures that show up as change in threshold voltage or transfer characteristics are quickly detected.

**B78-10008**

#### **PORTABLE SPARK-GAP ARC GENERATOR**

L. R. IGNACZAK

Jun. 1978

**LEWIS-12886**

**Vol. 3, No. 1, p. 10**

Self-contained spark generator that simulates electrical noise caused by discharge of static charge is useful tool when checking sensitive component and equipment. In test set-up, device introduces repeatable noise pulses as behavior of components is monitored. Generator uses only standard commercial parts

## 01 ELECTRONIC COMPONENTS AND CIRCUITS

and weighs only 4 pounds; portable dc power supply is used. Two configurations of generator have been developed: one is free-running arc source, and one delivers spark in response to triggering pulse.

**B78-10009**

### COAXIAL ISOLATOR HAS VERSATILE INTERFACE

D. L. OLSSON (TRW, Inc.)

Jun. 1978

**MSC-16908**

Vol. 3, No. 1, p. 11

Approach increases system-packaging flexibility. Isolators are constructed with removable connectors that can be changed to meet user's requirements. Technique reduces development scheduling problems. Isolators can be procured before package design is firm and then readily reconfigured to meet final design requirements. Changes to existing designs to incorporate removable connectors are minimal. Small adapter plates increase size modestly; weight increase is negligible.

**B78-10010**

### SIMPLE TOOL REMOVES IC FLAT PACKS

J. EGGBEEN (Sperry Rand Corp.)

Jun. 1978

**MSC-16058**

Vol. 3, No. 1, p. 12

Handtool has bifurcated handle that can be tightened so that clamping head grips pack securely. Tool easily removes hybrid integrated-circuit flat packs from printed-wiring boards. It does not damage circuit or board; thus, board can be reused with replacement circuit, and old circuit can be analyzed for faults and, if possible, repaired.

**B78-10011**

### DIGITAL PHASE SHIFTER SYNCHRONIZES LOCAL OSCILLATORS

S. M. ALI (Rockwell International Corp.)

Jun. 1978

**MSC-16695**

Vol. 3, No. 1, p. 12

Digital phase-shifting network is used as synchronous frequency multiplier for applications such as phase-locking two signals that may differ in frequency. Circuit has various phase-shift capability. Possible applications include data-communication systems and hybrid digital/analog phase-locked loops.

**B78-10012**

### EFFICIENT DC-TO-DC CONVERTER

J. M. BLACK

Jun. 1978

**FRC-11014**

Vol. 3, No. 1, p. 14

Circuit consists of chopper section which converts input dc to square wave, followed by bridge-rectifier stage. Chopper gives nearly-ideal switching characteristics, and bridge uses series of full-wave stages rather than less-efficient half-wave rectifiers found in previous circuits. Special features of full-wave circuit allow redundant components to be eliminated, lowering parts count. Circuit can also be adapted for use as dc-to-dc converter or as combination dc-and-ac source.

**B78-10148**

### SYMMETRIC VOLTAGE-CONTROLLED VARIABLE RESISTANCE

J. C. VANELLI (Lockheed Elec. Co., Inc.)

Oct. 1978

**MSC-16685**

Vol. 3, No. 2, p. 165

Feedback network makes resistance of field-effect transistor (FET) same for current flowing in either direction. It combines control voltage with source and load voltages to give symmetric current/voltage characteristics. Since circuit produces same magnitude output voltage for current flowing in either direction, it introduces no offset in presence of altering polarity signals. It is therefore ideal for sensor and effector circuits in servocontrol systems.

**B78-10149**

### FAST DIFFERENTIAL ANALOG-TO-DIGITAL CONVERSION

A. G. BIRCHENOUGH and W. J. RICE

Oct. 1978

**LEWIS-12909**

Vol. 3, No. 2, p. 166

Technique first digitizes difference between input and previous conversion. Digitized difference is added to previous digitized value to yield new digital representation of analog input. Output of analog-to-digital converter is useful as digital derivative of input signal.

**B78-10150**

### IMPROVED SERVOCONTROL SYSTEM

E. C. BUCHANAN

Oct. 1978

**M-FS-19358**

Vol. 3, No. 2, p. 167

System combines error signal with output of deadband circuit, which offsets any decrease in gain of error circuit for rapid changes in input signal.

**B78-10151**

### HIGH-POWER RF SWITCH

E. R. CARO

Oct. 1978

**NPO-14229**

Vol. 3, No. 2, p. 168

Switch designed for vacuum environments can handle 5 kilowatts of microwave power. Arcing between conductors is prevented by filling gaps with Teflon rather than with inert gas as in conventional switches. Thus, switch is not susceptible to gas leakage, problem faced by conventional switches in high-vacuum applications. Compact three-port switch, developed for microwave radar transmitters aboard spacecraft, is operated by depressing spring-mounted insulating pins that can be remotely actuated by relay. When pin is depressed, it routes microwave signals to selected output port.

**B78-10152**

### TEMPERATURE STABILIZATION OF MICROWAVE FERRITE DEVICES

R. KAMINSKY (Cutler Hammer, Inc.) and E. J. WENDT (Cutler Hammer, Inc.)

Oct. 1978

**MSC-16833**

Vol. 3, No. 2, p. 169

Thin-film heating element for strip-line circulator is sandwiched between insulation and copper laminations. Disks conform to shape of circulator ferrite disks and are installed between copper-clad epoxy ground planes. Heater design eliminates external cartridges and reduces weight by approximately one-third.

**B78-10153**

### IC IMPLEMENTATION OF CROSSBAR SWITCHES

T. O. ANDERSON

Oct. 1978

**NPO-13837**

Vol. 3, No. 2, p. 170

Basic switching-element configuration can be expanded to more complex networks by coupling basic building blocks in appropriate way. In all cases, binary addressing of input and output ports is used.

**B78-10154**

### STROBE-MARGIN TEST FOR PLATED MEMORY SYSTEMS

T. E. ANSPACH (Honeywell, Inc.), J. W. CLARKE (Honeywell, Inc.), and R. C. CONSTABLE (Honeywell, Inc.)

Oct. 1978

**M-FS-23838**

Vol. 3, No. 2, p. 171

Technique measures performance of plated-wire memories. Strobe-margin test (SMT) utilizes worst-case testing and automatically gives exact strobe margin. Test is automatic; thus, memory system-level test is superior to tests at component level that use artificial test conditions. Test is significant tool in design and test of plated-wire memory systems. It can rapidly quantify memory-system margin on each production unit and impact of any design changes.

**B78-10155**

### SAFE VENTING FOR ELECTRONIC COMPONENTS

R. CURRIN, JR. (Rockwell Intern. Corp.) and C. W. FISCHER (Rockwell Intern. Corp.)

Oct. 1978

**MSC-18007**

Vol. 3, No. 2, p. 171



Vented enclosure is made from lightweight metal. Printed-circuit boards are attached to bottom and end bulkheads and to top cover. Airflow cools components indirectly through walls of inner compartment. Flammability and smoke tests demonstrate safety of enclosure.

**B78-10156**

**DIRECT-READING GROUP-DELAY MEASUREMENT**

D. L. TROWBRIDGE

Oct. 1978

**NPO-13909**

**Vol. 3, No. 2, p.172**

Technique for measuring modulation signal retardation in microwave components gives direct plot of dependence of delay time on carrier frequency. Recorder sensitivity can be adjusted to give convenient scale factor for group delay. From family of such recordings, it is possible to observe changes in group delay due to temperature, mechanical stress, and other factors.

**B78-10157**

**SYNCHRONOUS TRANSFER CIRCUITS FOR REDUNDANT SYSTEMS**

S. NAGANO

Oct. 1978

**NPO-14162**

**Vol. 3, No. 2, p. 173**

Circuit arrangements for flip-flops, counters, and clock drivers in redundant systems ensure that control is synchronously transferred to surviving components when failure occurs. In addition to original application to spacecraft systems, redundant circuits have terrestrial uses in power generators, solar-energy converters, computers, vehicle controllers, and other systems demanding high reliability.

**B78-10158**

**ANALYZING CMOS/SOS FABRICATION FOR LSI ARRAYS**

A. C. IPRI (RCA Corp.)

Oct. 1978 See also NASA CR-150213 (N76-78470)

**M-FS-23788**

**Vol. 3, No. 2, p. 174**

Report discusses set of design rules that have been developed as result of work with test arrays. Set of optimum dimensions is given that would maximize process output and would correspondingly minimize costs in fabrication of large-scale integration (LSI) arrays.

**B78-10297**

**AUTOMATIC GAIN-BALANCING CIRCUIT**

D. F. EISENHUT (TRW, Inc.)

Jan. 1979 See also NASA CR-145137 (N77-19560)

**LANGLEY-12074**

**Vol. 3, No. 3, p. 319**

Energy reaching sensor is collected by telescope, modulated by chopper, spectrally filtered, and simultaneously directed onto two detectors. Gains through multiple signal paths are automatically balanced to 1 part in 10,000. Circuit compensates for slow changes in optical and electrical gains common to gas-filter correlation spectrometers.

**B78-10298**

**HIGH-SPEED, HIGH-POWER, SWITCHING TRANSISTOR**

D. CARNAHAN (Westinghouse Electric Corp.), C. K. OHU (Westinghouse Electric Corp.), and P. L. HOWER (Westinghouse Electric Corp.)

Jan. 1979 See also NASA CR-135013 (N76-28470)

**LEWIS-13021**

**Vol. 3, No. 3, p. 320**

Silicon transistor rate for 200 angstroms at 400 to 600 volts combines switching speed of transistors with ruggedness, power capacity of thyristor. Transistor introduces unique combination of increased power-handling capability, unusually low saturation and switching losses, and submicrosecond switching speeds. Potential applications include high power switching regulators, linear amplifiers, chopper controls for high frequency electrical vehicle drives, VLF transmitters, RF induction heaters, kitchen cooking ranges, and electronic scalpels for medical surgery.

**B78-10299**

**SIMPLE DIGITAL PULSE-PROGRAMING CIRCUIT**

J. L. LANGSTON (Texas Instruments, Inc.)

Jan. 1979

**NPO-13747**

**Vol. 3, No. 3, p. 321**

Pulse-sequencing circuit uses only shift register and Exclusive-OR gates. Circuit also serves as date-transition edge detector (for rising or falling edges). It is used in sample-and-hold, analog-to-digital conversion sequence control, multiphase clock logic, precise delay control computer control logic, edge detectors, other timing applications, and provides simple means to generate timing and control signals for data transfer, addressing, or mode control in microprocessors and minicomputers.

**B78-10300**

**AUTOMATIC CIRCUIT INTERRUPTER**

W. S. DWINELL (Rockwell International Corp.)

Jan. 1979

**MSC-16697**

**Vol. 3, No. 3, p. 322**

In technique, voice circuits connecting crew's cabin to launch station through umbilical connector disconnect automatically unused, or deadened portion of circuits immediately after vehicle is launched, eliminating possibility that unused wiring interferes with voice communications inside vehicle or need for manual cutoff switch and its associated wiring. Technique is applied to other types of electrical actuation circuits, also launch of mapped vehicles, such as balloons, submarines, test sleds, and test chambers-all requiring assistance of ground crew.

**B78-10301**

**EASILY-WIRED TOGGLE SWITCH**

W. T. DEAN (Rockwell International Corp.) and E. J. STRINGER (Rockwell International Corp.)

Jan. 1979

**MSC-18102**

**Vol. 3, No. 3, p. 323**

Crimp-type connectors reduce assembly and disassembly time. With design, no switch preparation is necessary and socket contracts are crimped to wires inserted in module attached to back of toggle switch engaging pins inside module to make electrical connections. Wires are easily removed with standard detachment tool. Design can accommodate wires of any gage and as many terminals can be placed on switch as wire gage and switch dimensions will allow.

**B78-10302**

**AUTOMATIC LOAD SHARING IN INVERTER MODULES**

S. NAGANO

Jan. 1979

**NPO-14056**

**Vol. 3, No. 3, p. 324**

Active feedback loads transistor equally with little power loss. Circuit is suitable for balancing modular inverters in spacecraft, computer power supplies, solar-electric power generators, and electric vehicles. Current-balancing circuit senses differences between collector current for power transistor and average value of load currents for all power transistors. Principle is effective not only in fixed duty-cycle inverters but also in converters operating at variable duty cycles.

**B78-10303**

**HALL DEVICES IMPROVE ELECTRIC MOTOR EFFICIENCY**

W. HAEUSSERMANN

Jan. 1979

**M-FS-23828**

**Vol. 3, No. 3, p. 325**

Efficiency of electric motors and generators is reduced by radial magnetic forces created by symmetric fields within device. Forces are sensed and counteracted by Hall devices on excitation or control windings. Hall generators directly measure and provide compensating control of an asymmetry, eliminating additional measurements needed for calibration feedback control loop.

**B78-10304**

**IMPROVED DRIVER FOR CAPACITIVE LOADS**

R. T. MATSUMOTO (Rockwell Intern. Corp.)

Jan. 1979

**LANGLEY-11609**

**Vol. 3, No. 3, p. 326**

Bias resistors with large voltage swings are replaced by transistorized current sources and bias currents are reduced to level where beta of devices is acceptable. Innovation has other applications in circuits driving pulsed capacitive loads.

## 01 ELECTRONIC COMPONENTS AND CIRCUITS

**B78-10305**

### **Z-AXIS CONTROL LOOP FOR CATHODE-RAY TUBES**

A. J. RAY, JR. (Ball Bros. Res. Corp.)

Jan. 1979

**NPO-13775**

**Vol. 3, No. 3, p. 324**

Inexpensive PIN diode detector samples screen brightness between camera frames generating error signal for feedback control of intensity. System was tested by taking flat-field exposures at several density levels over 4 hour period. Results showed processed film density levels varied by less than + or - 10 percent usually centering around + or - 8 percent.

**B78-10306**

### **THREE-FUNCTION SIGNAL GENERATOR**

G. F. KOPP (Honeywell, Inc.)

Jan. 1979

**MSC-16672**

**Vol. 3, No. 3, p. 328**

Variable-frequency circuit develops sine square and triangular waveforms. Three-function generator used variable-rate integrator to generate triangular wave and zero-crossing detector to develop square wave. Sine wave generator uses diode matrix to operate on triangular wave, thus with design harmonic distortion in output is less than one percent. By changing values of outboard resistors and capacitors, same design can be used at higher frequencies.

**B78-10307**

### **POWER-SWITCH DV/DT SENSING**

R. L. JONES

Jan. 1979

**MSC-16707**

**Vol. 3, No. 3, p. 329**

Simple means for controlling voltage risetime and powerline noise used three transistors and capacitive feedback. Rate of change of voltage across load is reduced and controlled by circuit. Circuit is useful in situations where large wire bundles are subject to noise and crosstalk due to rapid current switching.

**B78-10308**

### **PHASE-SHIFT ARRAY, ARBITRARY AND CONTINUOUS THROUGH 360 DEG**

A. C. DIBBLE, JR. and R. E. GRANDLE

Jan. 1979

**LANGLEY-12272**

**Vol. 3, No. 3, p. 330**

Langley Research Center's Phase-shift array satisfies requirement to phase shift common source signal into array of branch circuits thus simplifying multiple phase control. With system, wiring and assembly are uncomplicated, requiring no switching networks and system can be operated at any desired frequency. Design provides effective solution to problem of multiple shift control.

**B78-10309**

### **IMPLEMENTING OQASK BY USING MSK**

M. K. SIMON

Jan. 1979

**NPO-13896**

**Vol. 3, No. 3, p. 331**

Concept simplifies implementation of offset quadrature amplitude-shift-keyed signal when encoding digital information for transmission. Although originally developed for deep-space radio transmission, concept can find applications in various band-width constrained systems and in digital radio communications. Also is particularly useful in high volume data transmission as means of encoding and decoding.

**B78-10310**

### **TERRESTRIAL PHOTOVOLTAIC MEASUREMENTS**

H. W. BRANDHORST, JR. and H. B. CURTIS

Jan. 1979 See also NASA CP-2010 (N77-30521); NASA-TM-73788 (N78-14629); NASA-TM-73702 (N77-29603)

**LEWIS-13057**

**Vol. 3, No. 3, p. 331**

Revised measurement and calibration procedures are available. ERDA workshop utilized experience gained in solar cell research to define and explore additional measurement needs of photovoltaic community. Interim measurement procedures previously established were revised and published in manual in addition to other procedures.

**B78-10311**

### **CMOS-ARRAY DESIGN-AUTOMATION TECHNIQUES**

A. FELLER (RCA Corp.) and T. LOMBARDT (RCA Corp.)

Jan. 1979 See also NASA-CR-150221 (N77-78784)

**M-FS-23762**

**Vol. 3, No. 3, p. 322**

Thirty four page report discusses design of 4,096-bit complementary metal oxide semiconductor (CMOS) read-only memory (ROM). CMOSROM is either mask or laser programmable. Report is divided into six sections; section one describes background of ROM chips; section two presents design goals for chip; section three discusses chip implementation and chip statistics; conclusions and recommendations are given in sections four thru six.

**B78-10448**

### **MULTICHANNEL VCO NEEDS ONLY ONE REFERENCE**

R. K. MASSON (Hughes Aircraft Co.) and N. P. MORENC (Hughes Aircraft Co.)

Mar. 1979

**MSC-18225**

**Vol. 3, No. 4, p. 471**

Frequency stabilizing circuit controls output of multichannel microwave oscillator using passband filters and selector logic to eliminate need for separate crystal diode voltage controlled oscillator (VCO).

**B78-10449**

### **ARC DETECTOR USES FIBER OPTICS**

E. J. FINNEGAN and R. A. LEECH

Mar. 1979

**NPO-13377**

**Vol. 3, No. 4, p. 472**

Arc detector for protecting high-power microwave klystron oscillators uses fiber optics connected to remote solid-state light-sensing circuits. Detector is more reliable, smaller, and sensitive than other systems that locate detector in waveguide.

**B78-10450**

### **MINIATURE KU-BAND DOWN CONVERTER**

D. A. NORBURY (Avantek, Inc.)

Mar. 1979

**MSC-18313**

**Vol. 3, No. 4, p. 473**

Hybrid circuit serves as receiver front end for 13.75- to 14.0-GHz communications and radar systems. Complete microwave integrated circuit (MIC) assembly is packaged in small hermetically welded, nitrogen-filled aluminum case. Simplicity and size proves useful for lower-frequency wideband applications.

**B78-10451**

### **TESTING INTEGRATED CIRCUITS BY PHOTOEXCITATION**

J. J. ERICKSON (Hughes Aircraft Co.) and M. E. LEVY (Hughes Aircraft Co.)

Mar. 1979

**M-FS-23943**

**Vol. 3, No. 4, p. 474**

System for testing integrated circuits uses photoexcitation to determine quality of internal elements inaccessible to electrical tests. Approach prevents direct monitoring of internal operation of circuit by measurements at external terminals and is superior to electron beam scanning due to nondestructiveness.

**B78-10452**

### **PRECISE MATCHING OF DIODES**

W. T. MCCLYMAN

Mar. 1979

**NPO-14293**

**Vol. 3, No. 4, p. 475**

Two circuit arrangements using ac and dc power source provide low-cost method for matching forward voltage drops of diodes and other semiconductors. Both circuits are simpler and less expensive than conventional, characteristic-curve tracers.

**B78-10453**

### **SPlicing SHIELDED CABLES**

W. P. LIND (Rockwell Intern. Corp.) and W. R. MCGOUGAN (Rockwell Intern. Corp.)

Mar. 1979

**MSC-18297**

**Vol. 3, No. 4, p. 476**

**B78-10454****MODULAR GROUND-WIRE CONNECTOR**

W. T. DEAN (Rockwell Intern. Corp.) and E. J. STRINGER (Rockwell Intern. Corp.)

Mar. 1979

**MSC-16633**

Vol. 3, No. 4, p. 477

Chassis-mounted module makes it easy to remove and attach ground wires. With module, more ground connections are made in smaller area and no terminal lugs, lockwashers, or locknuts are required. Device also reduces holes that are punched or drilled in chassis for ground connections.

**B78-10455****ELECTRICAL-GROUND MONITOR**

T. D. LYONS (Lockheed Electronics Co.)

Mar. 1979

**MSC-18281**

Vol. 3, No. 4, p. 477

Instrument for detecting short circuits monitors ground connections and sounds alarm if out-of-limits condition occurs. Circuit includes electronics that prevent false triggering by high-resistance or capacitive paths and other noise.

**B78-10456****ONE-THIRD SELECTION FOR MATRIX-ADDRESSING FERROELECTRICS**

L. E. TANNAS, JR. (Rockwell Intern. Corp.)

Mar. 1979

**LANGLEY-11993**

Vol. 3, No. 4, p. 479

Automatic-gain-control (AGC) circuit regulates gain of intermediate frequency and radio-frequency signals over wide dynamic range with high linearity and very low phase shift. Potential application include radio and television receivers, signal distribution systems, and test and measurement instruments.

**B78-10457****SIMPLIFIED PHASE DETECTOR**

L. M. HERSHEY

Mar. 1979

**NPO-13395**

Vol. 3, No. 4, p. 480

Tanlick sine-wave phase detector gives dc output voltage nearly proportional to phase difference between oscillator signal and reference signal. Device may be used for systems in which signal-to-noise ratio is high.

**B78-10458****DIGITAL CORRELATOR WITH FEWER IC'S**

G. G. APPLE (TRW, Inc.) and L. RUBIN (TRW, Inc.)

Mar. 1979

**MSC-16743**

Vol. 3, No. 4, p. 481

Digital correlator requires only few integrated circuits to determine synchronization of two 24-bit digital words. Circuit is easily reduced or expanded to accommodate shorter or longer words and can be utilized in industrial and commercial data processing and telecommunications.

**B78-10459****PULSE-WIDTH-MODULATED ATTENUATOR FOR AGC**

J. W. MACCONNELL

Mar. 1979

**NPO-14127**

Vol. 3, No. 4, p. 483

Automatic-gain-control (AGC) circuit regulates gain of intermediate-frequency and radio-frequency signals over wide dynamic range with high linearity and very low phase shift. Device has potential uses in radio and television receivers, signal distribution systems, and test and measurement instruments.

**B78-10460****OVERLOAD PROTECTION SYSTEM**

S. NAGANO

Mar. 1979

**NPO-13872**

Vol. 3, No. 4, p. 484

Overload protection circuit utilizes one circuit for suspending inverter action when load abnormality is detected and second circuit to monitor clearance of abnormality. Device wastes no power during normal operating conditions and responds instantaneously when abnormality is cleared.

**B78-10461****LOAD BALANCING MULTIMODULE SWITCHING POWER CONVERTERS**

W. T. MCLYMAN and G. W. WESTER

Mar. 1979

**NPO-13832**

Vol. 3, No. 4, p. 485

Regulating system individually adjusts duty cycles of modules so that all share load equally, thus, protects individual modules and their components from overload and increases reliability and life expectancy. Converters are alternative to high-power, single unit systems.

**B78-10462****ELIMINATING GOLD MIGRATION IN MICROCIRCUITS**

A. DERMARDEROSIAN (Raytheon Co.) and C. R. MURPHY (Rockwell Intern. Corp.)

Mar. 1979

**MSC-18213**

Vol. 3, No. 4, p. 486

Report discusses how effects of moisture and other factors causing bridging between conductors can be prevented. Study details how several factors such as contaminants, large packages, high voltage, narrow conductor spacing and temperature contribute to moisture problems.

## 02 ELECTRONIC SYSTEMS

**B78-10013****VIDEO SCRAMBLER/DESCRAMBLER**

P. C. LIPOMA (Lockheed Electronics Co., Inc.) and K. H. VORHABEN (Lockheed Electronics Co., Inc.)

Jun. 1978

**MSC-16843**

Vol. 3, No. 1, p. 17

Video scrambler that operates on baseband signals uses relatively simple delay and inversion circuitry to alter television signal so that it is unrecognizable when picked up on TV monitor. Descrambler that uses essentially same circuit restores signal and allows original video information to be retrieved. Circuits allow only authorized parties to have access to transmitted information.

**B78-10014****ACCURATE POSITIONING OF CHARACTERS ON CRT DISPLAYS**

J. R. DAMIAN (IBM, Corp.)

Jun. 1978

**MSC-16505**

Vol. 3, No. 1, p. 18

Two systems, one digital and one analog, improve positioning of characters in cathode-ray tube (CRT) display systems. Circuits minimize effects of amplifier settling times--effects that can displace and distort characters in high-speed multiplexed systems.

**B78-10015****COMPUTER INTERFACE FOR MECHANICAL ARM**

W. L. DEROCHE (Martin Marietta Corp.) and R. O. ZERMUEHLEN (Martin Marietta Corp.)

Jun. 1978

**M-FS-23849**

Vol. 3, No. 1, p. 20

Man/machine interface commands computer-controlled mechanical arm. Remotely-controlled arm has six degrees of freedom and is controlled through 'supervisory-control' mode, in which all motions of arm follow set of preprogrammed sequences. For simplicity, few prescribed commands are required to accomplish entire operation. Applications include operating computer-controlled arm to handle radioactive or explosive materials or commanding arm to perform functions in hostile environments. Modified version using displays may be applied in medicine.

**B78-10016****CALIBRATION METHOD FOR AN ULTRASONIC GRAY-**

## 02 ELECTRONIC SYSTEMS

### SCALE RECORDER

P. E. MOORHEAD

Jun. 1978

**LEWIS-12782**

Vol. 3, No. 1, p. 20

Calibrated method for ultrasonic C-scanning is based on direct correlation of gray-scale response to electronic signal used. In procedure, optical density of reference recording is measured to generate curve of reflective intensity versus transmission.

**B78-10017**

### HIGH-RESOLUTION GRAY-SCALE RECORDER

P. E. MOORHEAD, T. M. DAVIS, and R. L. SORG

Jun. 1978

**LEWIS-12783**

Vol. 3, No. 1, p. 22

Electronic circuit makes it possible to obtain gray-scale recordings with good contrast and linearity over entire recording density range for ultrasonic testing unit. Electronic circuit produces square wave of constant voltage but of varying width. Frequency of square-wave pulses can be adjusted to determine optimum pulse frequency.

**B78-10018**

### MULTIPLE-INPUT LAND-USE SYSTEM CONCEPT

F. C. BILLINGSLEY, N. A. BRYANT, and A. L. ZOBRIST

Jun. 1978

**NPO-13903**

Vol. 3, No. 1, p. 23

Image based information system would accept data in a variety of formats and convert it to registered raster-scan with single format. Images could then be manipulated by system processor to read out desired information. Existing methods of digital-image processing could be modified to develop necessary software and hardware needed to implement system.

**B78-10019**

### MICROSTRIP BACKFIRE ANTENNA

T. G. CAMPBELL and N. V. COHEN (Old Dominion Univ.)

Jun. 1978

**LANGLEY-12172**

Vol. 3, No. 1, p. 24

Microstrip resonator is improvement over dipole-fed waveguide-fed backfire designs. Advantages include simpler construction with reduction in weight and size over other backfire designs. Microstrip backfire concept has potential in dual-polarization antenna systems, array-thinning designs, and feed designs for larger parabolic reflectors.

**B78-10020**

### TEST-VEHICLE CYCLE PROGRAMMER

D. J. LESCO and R. F. SOLTIS

Jun. 1978

**LEWIS-12977**

Vol. 3, No. 1, p. 24

Instrument reduces manpower needed for testing electric powered vehicles. Device has dual scale that allows operator to compare actual speed with preprogrammed test speed. Features include large meter, buzzer, packaging to allow ready interchange of memories with different profiles, small size, minimal current drain, and reverse supply voltage protection.

**B78-10021**

### OPTICAL TRAFFIC-SENSING CONCEPT

A. R. JOHNSTON and K. SHIMADA

Jun. 1978

**NPO-13603**

Vol. 3, No. 1, p. 26

Scaled-up optical proximity detector is versatile traffic sensor that replaces or augments existing systems such as inductive loops. Photosensor which does not depend on ambient light has several features that protect it against spurious or ambiguous inputs. It could be implemented in several forms to cope with different roadway conditions.

**B78-10022**

### VOICE-OUTPUT SOLAR ENERGY REPORTER

B. L. DETTERMAN and R. L. MILLER

Jun. 1978

**LEWIS-12947**

Vol. 3, No. 1, p. 27

Reporter combines commercially available equipment to sense solar energy and measure instantaneous intensity and accumulated

energy at remote site. Data are encoded in voice form and stored for retrieval at any time by commercial telephone.

**B78-10023**

### SIMPLIFIED DATA COMPRESSOR

R. F. RICE, V. C. TYREE, and C. WU

Jun. 1978

**NPO-14041**

Vol. 3, No. 1, p. 28

Image data are compressed for transmission by simple, economical circuitry. Compressor handles data in blocks of 64 samples. Mean from previous line is subtracted, and pseudo-random sequence of positive and negative 1's multiplies samples of each block. Hadamard transform applied to blocks yields 64 transform coefficients. Each coefficient is compared with approximation to corresponding coefficient of previous line, and difference is quantized. Values are transmitted or stored. Procedure is reversed to reproduce image.

**B78-10024**

### PREVENTING RADIO-PAGING SYSTEM TIEUP

J. P. JASMIN (Rockwell International Corp.)

Jun. 1978

**MSC-19696**

Vol. 3, No. 1, p. 29

Time-delay relay limits message time of emergency radio-paging system, thereby preventing inadvertent tieup. Relay is connected with telephone circuit and permits adjustable message time between 30 and 55 seconds. After that time interval, relay opens, making line free for another paging regardless of what previous caller did with his telephone.

**B78-10025**

### HYBRID RANDOM-SOUND TEST-CONTROL SYSTEM

R. C. WOODBURY

Jun. 1978

**NPO-13900**

Vol. 3, No. 1, p. 30

Controller develops gain-control signals by comparing detected sound levels in each band with reference set levels. By eliminating multiplexing network and single clock used in digital system, design allows servocontrol rate for each band to be adjusted independently.

**B78-10026**

### SELF-NAVIGATING ROBOT

A. M. THOMPSON

Jun. 1978

**NPO-14190**

Vol. 3, No. 1, p. 31

Rangefinding equipment and onboard navigation system determine best route from point to point. Research robot has two TV cameras and laser for scanning and mapping its environment. Path planner finds most direct, unobstructed route that requires minimum expenditure of energy. Distance is used as measure of energy expense, although other measures such as time or power consumption (which would depend on the topography of the path) may be used.

**B78-10159**

### FINDING RADIANT-ENERGY SOURCES

G. J. SCHAFFER (Hughes Aircraft Co.)

Oct. 1978 See also B77-10264

**GSFC-12147**

Vol. 3, No. 2, p. 177

Antenna is scanned in orthogonal directions to pinpoint interfering sources. Satellite system locates ground-based microwave transmitter to accuracy of about 100 miles. When data on misalignment of satellite antenna boresight are used to correct antenna pointing, accuracy is improved to better than 70 miles.

**B78-10160**

### NOISE TOLERANT COMPUTER LINK

M. W. SIEVERS

Oct. 1978

**NPO-14152**

Vol. 3, No. 2, p. 178

Inexpensive computer-to-computer link facilitates data communication in electrically noisy environments. Link can connect process-control computers while reducing errors from electrical noise of manufacturing operations.



**B78-10161****HUMAN ARM MAY ACT AS ANTENNA**

J. C. GADDIE (Stanford Res. Inst.) and R. T. WOLFRAM (Stanford Res. Inst.)

Oct. 1978

**ARC-11195**

**Vol. 3, No. 2, p. 178**

Wrist strap with copper strips is used as coupler of radio-frequency energy. Wires at midpoints of strips lead to radio-frequency device that acts as transmitter or receiver. Varying widths of copper strips produces somewhat different characteristics.

**B78-10162****FEMTOSECOND TIME-DOMAIN PHASE COMPARATOR**

T. DONAHOE and V. REINHARDT

Oct. 1978

**GSFC-12228**

**Vol. 3, No. 2, p. 180**

Phase shift in test device is measured by summing output of mixer with ramp voltage and comparing time interval between zero crossings of summed signal and ramp reference frequency. Circuit can be used to test devices at other frequencies by changing only signal source, phase splitter, and mixer; divider and time-interval counter need not be driven by oscillator.

**B78-10163****CHOPPER-STABILIZED PHASE DETECTOR**

P. M. HOPKINS (Lockheed Elec. Co.)

Oct. 1978

**MSC-16461**

**Vol. 3, No. 2, p. 181**

Phase-detector circuit for binary-tracking loops and other binary-data acquisition systems minimizes effects of drift, gain imbalance, and voltage offset in detector circuitry. Input signal passes simultaneously through two channels where it is mixed with early and late codes that are alternately switched between channels. Code switching is synchronized with polarity switching of detector output of each channel so that each channel uses each detector for half time. Net result is that dc offset errors are canceled, and effect of gain imbalance is simply change in sensitivity.

**B78-10164****BIT-SYNCHRONIZER LOCK DETECTOR**

D. C. HUEY (TRW, Inc.) and B. A. ITRI (TRW, Inc.)

Oct. 1978

**MSC-16744**

**Vol. 3, No. 2, p. 182**

Circuit measures phase error that exists in phase-locked loop between clock signal recorded in data on magnetic tape and reconstructed clock signal. Circuit presents error as digital word that can be compared with predetermined threshold to indicate lock status. With simple alterations, circuit can also be used as phase detector.

**B78-10165****AUTOMATIC RADIO-TRANSMISSION MONITOR**

A. J. BERNSTEIN

Oct. 1978

**NPO-13941**

**Vol. 3, No. 2, p. 183**

System continuously monitors radio transmissions stored in memory. If spectrum deviates beyond present limits, alarm is tripped and spectrum is transferred to long-term storage for later analysis. Monitor can be useful in ensuring proper power level and spectral quality and in finding cause of failure. It might also be used to monitor radio-frequency interference or power levels of citizen's-band transmitters.

**B78-10166****CONTROL OF SMALL PHASED-ARRAY ANTENNAS**

G. D. DOLAND (Lockheed Elec. Co.)

Oct. 1978

**MSC-14938**

**Vol. 3, No. 2, p. 184**

Series of reports, patent descriptions, calculator programs, and other literature describes antenna control and steering apparatus for seven-element phased array. Though series contains information specific to particular system, it illustrates methods that can be applied to antennas with greater or fewer numbers of elements. Included are programs for calculating beam

parameters and design functions and information to interfacing digital controller to beam-steering apparatus.

**B78-10312****AUTOMATIC ACQUISITION AND RANGING SYSTEM**

R. M. GOLDSTEIN, W. P. HUBBARD, J. W. LAYLAND, W. L. MARTIN, and A. I. ZYGIELBAUM

Jan. 1979

**NPO-13982**

**Vol. 3, No. 3, p. 335**

Digital circuitry automatically demodulates received radio-frequency ranging signals for phase comparison with transmitted signal. All digital circuitry makes system more stable than analog predecessor and makes automatic operation easier and simpler.

**B78-10313****AIR-TRAFFIC SURVEILLANCE SYSTEMS**

P. F. MACDORAN

Jan. 1979

**NPO-14173**

**Vol. 3, No. 3, p. 336**

Passive ground-based radio-interferometry systems (RILS) monitor local air traffic by determining aircraft position in planes defined by surveillance area. Similar RILS arrangements are used to determine aircraft positions in three dimensions when combined with azimuth and range information obtained by radar. Information helps determine three-dimensional aircraft position without expensive encoding altimeters.

**B78-10314****OPTIMIZING MULTISLOT FEEDS FOR REFLECTING ANTENNAS**

D. K. WAINEO (Rockwell Intern. Corp.)

Jan. 1979

**NPO-14064**

**Vol. 3, No. 3, p. 337**

Multislot feed corrects phase errors in reflecting antennas. Variables are reduced by considering symmetry and corrective effect of each phase mode. Overall computation concerning calculation of correct phase angles while optimizing main beam efficiency is simplified by analysis used parabolic torus reflector aboard Space Shuttle.

**B78-10315****28-BIT SERIAL WORD SIMULATOR/MONITOR**

J. W. DURBIN (Rockwell Intern. Corp.)

Jan. 1979

**MSC-16418**

**Vol. 3, No. 3, p. 338**

Modular interface unit transfers data at high speeds along four channels. Device expedites variable-word-length communication between computers. Operation eases exchange of bit information by automatically reformatting coded input data and status information to match requirements of output.

**B78-10316****PORTABLE DATA SYSTEM**

M. DIX

Jan. 1979

**ARC-11136**

**Vol. 3, No. 3, p. 339**

Compact system for data recording, manipulation, and transmission uses readily available components. Data system originally designed for high-altitude research is used with appropriate sensors to monitor transportation systems, biomedical data, weather stations, mineral exploration equipment, and various other tasks.

**B78-10317****MICROWAVE-BEAM SAFETY SUBSYSTEM**

R. M. DICKINSON

Jan. 1979

**NPO-14224**

**Vol. 3, No. 3, p. 340**

Airspace between high-power microwave transmitters and receivers is dangerous to people, equipment, or birds flying in area. Hazard is reduced or eliminated by subsystem that monitors area and interrupts or alters microwave transmission during accidental intrusions.

**B78-10463****NARROW-BANDWIDTH RECEIVER**

## 02 ELECTRONIC SYSTEMS

E. A. MANUS (Virginia Polytechnic Institute and State University) and P. H. WILEY (Virginia Polytechnic Institute and State University)  
Mar. 1979

**GSFC-12142**

**Vol. 3, No. 4, p. 489**

Synchronous switching circuit reduces bandwidth and improves sensitivity of communications receiver. With modified receiver, signals 35 db below level can be detected.

**B78-10464**

### MEASURING RADIO-SIGNAL POWER ACCURATELY

R. M. GOLDSTEIN, J. W. NEWTON, and R. A. WINKELSTEIN  
Mar. 1979

**NPO-13373**

**Vol. 3, No. 4, p. 490**

Absolute value of signal power in weak radio signals is determined by computer-aided measurements. Equipment operates by averaging received signal over several-minute period and comparing average value with noise level of receiver previously calibrated.

**B78-10465**

### DETERMINING THE RESPONSE OF AN FM RECEIVER

J. C. PERRY (Lockheed Electronics Co.)

Mar. 1979

**MSC-16751**

**Vol. 3, No. 4, p. 491**

Frequency response to frequency-modulation (FM) receiver is measured with aid of phase-modulation (PM) transmitter by applying correction to output power level. As modulating frequency is increased, output level obtained in response to PM input is reduced by 6 db per octave.

**B78-10466**

### MORE EFFICIENT MICROWAVE-POWER TRANSMISSION

R. M. DICKINSON and W. T. BROWN (Raytheon Co.)

Mar. 1979

**NPO-13885**

**Vol. 3, No. 4, p. 492**

Small improvements in magnetron, receiving diodes, radiating antennas, and circulator sections of components add sizable improvement in microwave system efficiency. Further improvements in future are possible by adding new materials and designs to RF-to-dc converter or removal of circulator, power supply and redesigning of magnetron to tolerate low or high power levels.

**B78-10467**

### EFFICIENT DIGITAL ENCODING SCHEME

D. E. OBRIEN, III

Mar. 1979

**MSC-18267**

**Vol. 3, No. 4, p. 493**

Modified NRZ (non-return-to-zero) code immunizes record and playback systems against dc drift and bit slippage. In order to maximize bit packing density improved code called J-NRZ gives 100 percent NRZ efficiently and solves DC drift problem by adding check bits in specified format when long string is encountered. Remainder of data stream is encoded in NRZ format.

**B78-10468**

### WIDEBAND DIGITAL SPECTRUM ANALYZER

G. A. MORRIS, JR. and H. C. WILCK

Mar. 1979

**NPO-14394**

**Vol. 3, No. 4, p. 494**

Modular spectrum analyzer consisting of RF receiver, fast Fourier transform spectrum analyzer, and data processor samples stochastic signals in 220 channels. Construction reduces design and fabrication costs of assembled unit.

**B78-10469**

### ELIMINATING AMBIGUITY IN DIGITAL SIGNALS

W. J. WEBER, III

Mar. 1979

**NPO-14289**

**Vol. 3, No. 4, p. 495**

Multiamplitude minimum shift keying (mamsk) transmission system, method of differential encoding overcomes problem of ambiguity associated with advanced digital-transmission techniques with little or no penalty in transmission rate, error rate, or system complexity. Principle of method states, if signal points are properly encoded and decoded, bits are detected correctly, regardless of phase ambiguities.

**B78-10470**

### DATA REFORMATTING WITH LESS HARDWARE

A. ENGEL and L. R. SPRINGER

Mar. 1979

**NPO-13676**

**Vol. 3, No. 4, p. 496**

Dual-function integrated circuits use one shift register array instead of two to feed video data to seven tape channels thereby making system more reliable and less expensive than predecessor. Basic principle of reformatter is also applicable to multiplexing and frequency conversion circuits.

**B78-10471**

### EFFICIENT RECTIFYING ANTENNA

R. M. DICKINSON and W. C. BROWN (Raytheon Co.)

Mar. 1979

**NPO-13884**

**Vol. 3, No. 4, p. 497**

Rectifying antenna comprised of 17 subarrays positioned closely together to intercept microwave beam features low cost, high conversion efficiency, and high power handling capability. Tests demonstrate efficiency level of 82 percent in converting RF to dc.

**B78-10472**

### LIGHTWEIGHT CONICAL ANTENNA REFLECTOR

D. M. MOORE

Mar. 1979

**NPO-13552**

**Vol. 3, No. 4, p. 499**

Conical antenna reflectors using knitted mesh materials for aluminized film eliminate problem areas in thermal distortion and long term stability when film is subjected to ultraviolet radiation. Meshes may be selected from wide selection of yarns to form mesh membrane.

**B78-10473**

### COMPACT ANTENNA HAS SYMMETRICAL RADIATION PATTERN

E. A. KUHLMAN (McDonnell-Douglas Corp.) and E. D. MCKEE (McDonnell-Douglas Corp.)

Mar. 1979

**ARC-11189**

**Vol. 3, No. 4, p. 500**

Compact quadrifilar-helix antenna has exceptionally uniform and axially symmetric radiation pattern. It resists shock and vibration and gives excellent radiation characteristics which make it potentially useful for mobile citizenband radios and other terrestrial communications systems.

**B78-10474**

### MULTIPLEXED BATTERY-BYPASS CONTROL SYSTEM

J. C. BENNETT, H. A. FRANK, J. LEPISTO, and A. P. WAGNER

Mar. 1979 See also NASA-CR-155271 (N78-12317)

**NPO-14414**

**Vol. 3, No. 4, p. 501**

Cell-bypass control system senses low capacity cells before they overcharge or discharge. Relay automatically removes defective cell (when it is detected) from battery circuit. System shows promise for improving batteries in computer standby power systems, electric vehicles, and energy storage systems.

**B78-10475**

### SYSTEM FOR MONITORING LIGHTNING STRIKES

J. C. FUCAS and R. J. WOJASTNSKI

Mar. 1979

**KSC-11018**

**Vol. 3, No. 4, p. 502**

System for monitoring lightning strikes utilizes optical data link between lightning sensor and recording instruments thus making data link immune to electrical interference induced in wires by huge burst of energy in lightning strikes. It also protects people and equipment at data receiving end from electrical shock.

**B78-10476**

### TELECOMMUNICATIONS NETWORK OPTIMIZATION

J. LEE

Mar. 1979

**NPO-14486**

**Vol. 3, No. 4, p. 504**

Analysis discusses STACOM (state criminal justice communication) network topology program used to design and evaluate digital telecommunications networks STACOM employs ESAU-

WILLIAMS technique to search for direct links between system terminations and regional switching center. Inputs include traffic data, terminal locations, and functional requirements.

## 03 PHYSICAL SCIENCES

**B78-10027**

### IMPROVED OPTICAL FILTER

A. M. TITLE (Lockheed Missiles & Space Co., Inc.)

Jun. 1978

**GSFC-12225**

Vol. 3, No. 1, p. 35

Filter includes partial polarizer between birefringent elements. Plastic film on partial polarizer compensates for any polarization rotation by partial polarizer. Two quarter-wave plates change incident, linearly polarized light into elliptically polarized light.

**B78-10028**

### HOUSING PROTECTS LASER IN VACUUM

V. G. CANALI

Jun. 1978

**GSFC-12241**

Vol. 3, No. 1, p. 36

Airtight housing encloses laser for easy alignment and operation in high-vacuum chamber. Beam is transmitted through window into vacuum chamber. Flexible line runs through vacuum chamber to outside, maintaining laser enclosure at atmospheric pressure.

**B78-10029**

### DIRECTIONAL LASER VELOCIMETER WITH DOPPLER VELOCITY SIMULATOR

J. M. FRANKE

Jun. 1978

**LANGLEY-12176; LANGLEY-12177**

Vol. 3, No. 1, p. 36

Technique uses phase-shift networks at optical and baseband frequencies and, as such, is optical adaptation of previously-existing microwave technology. Application is planned for wind-tunnel velocity measurements. Alternative configuration produces finite fringes that move in one direction or other as measured particle approaches or recedes.

**B78-10030**

### FLUORESCENT PAINT SIMPLIFIES LASER-BEAM ALIGNMENT

H. A. WILL

Jun. 1978

**LEWIS-12571**

Vol. 3, No. 1, p. 38

Usually to align optics safely, low power laser which can safely operated without safety goggles is substituted for higher power laser during alignment procedure. Need for lower power substitute laser can be eliminated by painting target area with commercial paint which fluoresces strongly in red or yellow portion of spectrum when excited by argon laser beam.

**B78-10031**

### GLASS TUBES FOR PROTECTING SOLAR CELLS

B. SHELPUK (RCA Corp.)

Jun. 1978

**NPO-14200**

Vol. 3, No. 1, p. 38

Protecting solar cells against environmental effects is accomplished by putting them inside glass tubes instead of hermetically sealing them between pairs of flat glass sheets. If cells are coupled with storage battery integrated into tube, freestanding power source could be built.

**B78-10032**

### HIGH-TEMPERATURE SOLAR CONVERTER

G. ASCHER

Jun. 1978

**GSFC-12234**

Vol. 3, No. 1, p. 39

Converter has parabolic concentrator that directs sunlight

on three-dimensional absorber assembly within an evacuated glass cylinder. No tracking mechanism is required. Concentrator aperture is adjustable to modify concentration in direct or diffuse sunlight. Range of adjustment is small.

**B78-10033**

### DOUBLE-SIDED SOLAR-CELL PACKAGE

B. SHELPUK (RCA Corp.)

Jun. 1978

**NPO-14199**

Vol. 3, No. 1, p. 40

Cost-effective solar-cell package is proposed for development of practical solar-cell system. Since cells are enclosed in inexpensive plastic tubes, forced-air-cooling loop is proposed to maintain cell temperature at adequate levels. Loop must include desiccant to remove moisture from hermetic enclosures to prevent cell corrosion.

**B78-10034**

### REAL-TIME MONITORING OF CRUSTAL DEFORMATIONS

P. F. MACDORAN

Jun. 1978

**NPO-14124**

Vol. 3, No. 1, p. 42

System with two radio interferometer systems is used to detect crustal bulging of Earth's surface, which may be directly related to earthquakes.

**B78-10035**

### FLAT-PLATE HEAT PIPE

G. L. FLEISCHMAN (TRW, Inc.) and B. D. MARCUS (TRW, Inc.)

Jun. 1978

**GSFC-11998**

Vol. 3, No. 1, p. 43

Heat pipe has its working fluid sealed between two flat panels rather than in conventional cylindrical housing. Metal wick is installed between planes to provide continuous fluid path in cooperation with capillary grooves on inside surfaces of plates. Heat pipe is easily coupled to flat surfaces such as integrated circuit substrates, mirrors, and electronic cold plates and is more effective than conventional heat pipes when removing heat in these applications.

**B78-10036**

### VIDEO METHOD FOR STUDYING OPTICAL FIELDS

R. S. MEZRICH (RCA Corp.)

Jun. 1978

**M-FS-23103**

Vol. 3, No. 1, p. 44

Approach for measuring intensity distribution in optical field records pattern with vidicon and then displays it on oscilloscope, using vertical sweep as trigger. Single horizontal lines in field can be isolated by using sweep delay feature of oscilloscope.

**B78-10037**

### SOLAR-ENERGY BIBLIOGRAPHY

S. GARGUS

Jun. 1978 See also NASA TM-X-73398(N78-13554)

**M-FS-23823**

Vol. 3, No. 1, p. 44

Bibliography lists over 100 ongoing projects, Tech Briefs, papers and periodicals, and technical reports and patents pertaining to work performed at Marshall Space Flight Center and by its contractors. Each item includes brief summary or abstract of work, its publication date (except for ongoing research), and a listing of other materials related to that work. Comprehensive subject index is also included.

**B78-10167**

### IMPROVED 'SPECTROPHONE'

J. S. MARGOLIS and M. S. SHUMATE

Oct. 1978

**NPO-14143**

Vol. 3, No. 2, p. 187

Spectral lines of gas sample are modulated by electric field in optoacoustic gas analyzer. Pressure fluctuations caused by local heating of absorbing gas are picked up by microphone. Since laser is operated in continuous-wave (CW) mode, background noise due to heating of windows is eliminated.

**B78-10168**

### LOW-BACKGROUND TRACE-GAS DETECTOR

### 03 PHYSICAL SCIENCES

L. ROSENGREN

Oct. 1978

**NPO-13683**

**Vol. 3, No. 2, p. 188**

Spectrophon detects very small concentrations of trace gases. With gas in sample cell, laser is tuned to absorption line of interest. Molecular absorption in cell produces pulsed acoustical pressure at chopper frequency. Two optical paths with very different absorption lengths are used to pretune cell to balance out background absorption by cell windows.

**B78-10169**

**VIBRATION-FREE THERMAL LINK**

D. E. JENNINGS

Oct. 1978

**GSFC-12297**

**Vol. 3, No. 2, p. 188**

System designed to hold laser at temperature of cold tip of helium refrigerator uses thermally-conducting flexible straps and special layered support structure.

**B78-10170**

**PRACTICAL AND EFFICIENT MAGNETIC HEAT PUMP**

G. V. BROWN

Oct. 1978 See also NASA TM-X-73676 (N77-26616)

**LEWIS-12508**

**Vol. 3, No. 2, p. 190**

Method for pumping heat magnetically at room temperature is more economical than existing refrigeration systems. Method uses natural magneto-thermal effect of gadolinium metal to establish temperature gradient across length of tube. Regenerative cyclic process in which gadolinium sample is magnetized and gives off heat at one end of tube, and then is demagnetized at other end to absorb heat has established temperature gradients of 144 degrees F in experiments near room temperature. Other materials with large magnetothermal effects can be used below room temperature. Possible commercial applications include freeze-drying and food processing, cold storage, and heating and cooling of buildings, plants, and ships.

**B78-10171**

**PROTECTIVE COATING FOR LASER DIODES**

I. LADANY (RCA Corp.) and J. L. VOSSSEN, JR. (RCA Corp.)

Oct. 1978

**LANGLEY-11746**

**Vol. 3, No. 2, p. 191**

Coating for GaAs laser diodes should not alter optical and electrical properties. Borosilicate glass coating is easy to apply, breaks evenly when cleaved, and is abrasion and moisture resistant. Its low index of refraction makes thickness less critical when depositing half-wavelength coating.

**B78-10172**

**INFRARED-ENHANCED TV FOR FIRE DETECTION**

J. R. HALL (Rockwell Intern. Corp.)

Oct. 1978

**M-FS-19380**

**Vol. 3, No. 2, p. 191**

Closed-circuit television is superior to conventional smoke or heat sensors for detecting fires in large open spaces. Single TV camera scans entire area, whereas many conventional sensors and maze of interconnecting wiring might be required to get same coverage. Camera is monitored by person who would trip alarm if fire were detected, or electronic circuitry could process camera signal for fully-automatic alarm system.

**B78-10173**

**WIDE ANGLE PINHOLE CAMERA**

J. M. FRANKE

Oct. 1978

**LANGLEY-11905**

**Vol. 3, No. 2, p. 192**

Hemispherical refracting element gives pinhole camera 180 degree field-of-view without compromising its simplicity and depth-of-field. Refracting element, located just behind pinhole, bends light coming in from sides so that it falls within image area of film. In contrast to earlier pinhole cameras that used water or other transparent fluids to widen field, this model is not subject to leakage and is easily loaded and unloaded with film. Moreover, by selecting glass with different indices of refraction, field at film plane can be widened or reduced.

**B78-10174**

**LASER BEAM COLOR SEPARATOR**

J. M. FRANKE

Oct. 1978

**LANGLEY-11806**

**Vol. 3, No. 2, p. 193**

Multiwavelength laser beam is separated into series of parallel color beams using prism and retroreflector. Setup is inexpensive and needs no critical adjustments. It can incorporate several prisms to increase dispersion and reduce overall size. Transmission grating can be used instead of prism with sacrifice in efficiency. Spatial filter can remove unwanted beams.

**B78-10175**

**PULSED NMR SPECTROSCOPY**

D. P. BURUM, D. D. ELLEMAN, and W. RHIM

Oct. 1978

**NPO-14023**

**Vol. 3, No. 2, p. 194**

Method gives results approximating those of classical continuous-irradiation method but in less time. Method also makes it possible to measure chemical shifts and spin-lattice relaxation times with improved sensitivity. Equipment can be used for adiabatic demagnetization experiments, measurements of rotating-frame spin/lattice relaxation times, and accurate measurements of exact resonance points. When measuring relaxation times, pulse technique can be very effective since pulses may be limited in amplitude and length to prevent spin system from being driven into saturation.

**B78-10176**

**OPTICAL GYROSCOPE**

R. M. GOLDSTEIN and W. C. GOSS

Oct. 1978

**NPO-14258**

**Vol. 3, No. 2, p. 195**

Instrument uses phase difference between two beams of light to measure rotation. It is considerably simpler and more reliable than conventional spinning-mass gyroscopes used for inertial guidance and is more compact, lighter, and potentially less expensive. Moreover, optical gyroscope requires no warmup period. Although conceived for spacecraft and satellite stabilization, gyroscope should also find applications in flight instruments for private, commercial, and military aircraft.

**B78-10177**

**IMPROVED DOUBLE-PASS MICHELSON INTERFEROMETER**

R. A. SCHINDLER

Oct. 1978

**NPO-13999**

**Vol. 3, No. 2, p. 196**

Interferometer design separates beams by offsetting centerlines of cat's-eye retroreflectors vertically rather than horizontally. Since beam splitter is insensitive to minimum-thickness condition in this geometry, relatively-low-cost, optically flat plate can be used.

**B78-10178**

**ENERGY CONSERVATION, USING REMOTE THERMAL SCANNING**

R. L. BOWMAN and J. R. JACK

Oct. 1978 See also NASA TM-X-73570 (N77-21518)

**LEWIS-12812**

**Vol. 3, No. 2, p. 197**

Airborne thermal infrared scans and thermal maps utilized in NASA's energy conservation program have proven to be efficient cost-effective method for identifying heat losses from building roofs and heating system distribution lines. Method employs commercially available equipment in highly developed way.

**B78-10179**

**ELECTROLYSIS CELL STIMULATION**

L. H. GORDON, B. R. PHILLIPS, and J. EVANGELISTA (Wyandotte Corp.)

Oct. 1978

**LEWIS-12740**

**Vol. 3, No. 2, p. 198**

Computer program represents attempt to understand and model characteristics of electrolysis cells. It allows user to determine how cell efficiency is affected by temperature, pressure, current density, electrolyte concentration, characteristic dimen-



sions, membrane resistance, and electrolyte circulation rate. It also calculates ratio of bubble velocity to electrolyte velocity for anode and cathode chambers.

**B78-10180****PROTOTYPE SOLAR-HEATING SYSTEM**

Innovator not given (IBM Corp.) Oct. 1978 See also NASA CR-150534 (N78-17484); B78-10194; B78-10195

**M-FS-23916** Vol. 3, No. 2, p. 201

Complete air-collector system to meet needs of single-family dwelling is designed to operate in any region of United States except extreme north and south. Design can be scaled up or down to accommodate wide range of heating and hot-water requirements for single-family, multi-family, or commercial buildings without significantly changing design concept.

**B78-10181****RESIDENTIAL SOLAR-HEATING SYSTEM**

Innovator not given (Solafern, Ltd.) Oct. 1978 See also NASA CR-150515 (N78-18526)

**M-FS-23909** Vol. 3, No. 2, p. 202

Complete residential solar-heating and hot-water system, when installed in highly-insulated energy-saver home, can supply large percentage of total energy demand for space heating and domestic hot water. System which uses water-heating energy storage can be scaled to meet requirements of building in which it is installed.

**B78-10182****MULTICHANNEL TEMPERATURE CONTROL FOR SOLAR HEATING**

J. R. CURRIE

Oct. 1978

**M-FS-23775** Vol. 3, No. 2, p. 203

Multiplexer/amplifier circuit monitors temperatures and temperature differences. Although primarily designed for cycle control in solar-heating systems, it can also measure temperatures in motors, ovens, electronic hardware, and other equipment.

**B78-10183****PROGRAMMABLE CONTROLLER FOR SOLAR HEATING**

Innovator not given (Rho Sigma, Inc.) Oct. 1978 See also NASA CR-150535 (N78-17485)

**M-FS-23915** Vol. 3, No. 2, p. 204

Versatile microprocessor-based unit accepts sensor inputs and generates programmed control signals. Typical of possible applications would be to monitor differential temperature measurements in solar-heating systems, to turn on pumps and backup systems, and off-peak control for backup systems.

**B78-10184****UNIVERSAL TEST FIXTURE FOR SOLAR CELLS**

J. M. KOLYER (Rockwell Intern. Corp.)

Oct. 1978 See also B78-10185

**NPO-14062** Vol. 3, No. 2, p. 205

Coverings for solar cells are evaluated conveniently with alumina ceramic circuit board holding three pairs of cells and three field-effect translator (FET) chips overlaid with candidate encapsulant. With fixture, solar cells and encapsulants are exposed to Sunlight and weather, either natural or artificial, to provide pertinent measurement and performance data.

**B78-10185****ACCELERATED-WEATHERING TEST-SYSTEM FOR SOLAR CELLS**

J. M. KOLYER (Rockwell Intern. Corp.)

Oct. 1978 See also B78-10184

**NPO-14061** Vol. 3, No. 2, p. 206

Test system rapidly evaluates effects of sunlight, humidity, and temperature. System accelerates environmental testing since Sunlight is held at equivalent noon exposure (for a selected locality) for 12 hours; alternating light and dark periods are included to check for possible dark reactions in specimens.

**B78-10186****AUTOMATED SOLAR-CELL-ARRAY ASSEMBLY MACHINE**

E. N. COSTOGUE, R. L. MUELLER, J. K. PERSON, and R. K. YASUI

Oct. 1978

**NPO-13652**

Vol. 3, No. 2, p. 206

Continuous-feeding machine automatically bonds solar cells to printed-circuit substrate. In completed machine, cells move to test station where electrical characteristics could be checked. If performance of cell is below specifications, that cell is marked and removed. All machine functions are synchronized by electronics located within unit. It may help to lower costs in future solar-cell production.

**B78-10187****IMPROVED CONICAL SOLAR CONCENTRATOR**

J. S. GRIFFITH

Oct. 1978

**NPO-13825**

Vol. 3, No. 2, p. 207

Varied shapes give uniform concentration without significantly increasing fabrication costs. More complex shapes can be developed to make reflection pattern even more uniform without going over to parabolic surfaces. Various simple curves and S-shapes could be constructed by spinning or hydroforming methods.

**B78-10188****INEXPENSIVE, PORTABLE, INTEGRATING SOLAR ENERGY METER**

R. M. MASTERS

Oct. 1978 See also NASA TM-73791 (N78-14630); B75-10283

**LEWIS-12804**

Vol. 3, No. 2, p. 208

Silicon-cell insolometer automatically measures and totals amount of energy available in sunlight falling on the earth at specific location over selected period of time. Device incorporates single silicon solar cell as sensing element and relies on principle that short-circuit current from solar cell is directly proportional to amount of light that shines on cell.

**B78-10189****OPTICS FOR NATURAL LIGHTING**

H. B. EDWARDS

Oct. 1978

**LANGLEY-12333**

Vol. 3, No. 2, p. 209

Energy-saving optics utilize sky and sun for lighting. Innovative optical arrangements for transmitting outdoor light into building interiors are described using flat white and mirrored surfaces for converging and diverging light pipes.

**B78-10190****SELECTION STANDARD FOR FEP FILMS FOR SOLAR ENERGY**

M. W. REED (Vought Corp.)

Oct. 1978

**MSC-16999**

Vol. 3, No. 2, p. 211

Purple fluorocarbon ethylene propylene (FEP) films are more efficient due to low absorptance. Designers seeking to improve coatings quantify this effect and devise simple screening test based on transmittance of films.

**B78-10191****PROTOTYPE RESIDENTIAL SOLAR-ENERGY SYSTEM**

Innovator not given (IBM Corp.) Oct. 1978 See also NASA CR-150558 (N78-19649); B78-10192

**M-FS-23932**

Vol. 3, No. 2, p. 211

Complete solar-energy domestic-hot-water system for single-family residences is described in brochure. It contains data on procurement, installation, operation, and maintenance of system in residential or light commercial buildings. Appendix includes vendor brochures for major system components. Drawings, tables, and graphs complement text.

**B78-10192****PROTOTYPE RESIDENTIAL SOLAR-ENERGY SYSTEM-ENGINEERING ANALYSIS**

Innovator not given (IBM Corp.) Oct. 1978 See also NASA CR-150544 (N78-19604); B78-10191

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**M-FS-23929**

**Vol. 3, No. 2, p. 212**

Tests indicate performance very close to theoretical predictions. Major objectives were to verify system installation techniques, operation, and performance; to verify performance of individual subsystems; and to provide general test data base comparison with field data.

**B78-10193**

#### **RESIDENTIAL SOLAR-HEATING SYSTEM - DESIGN BROCHURE**

Innovator not given (Contemporary Systems, Inc.) Oct. 1978 See also NASA CR-150600 (N78-20615)

**M-FS-23933**

**Vol. 3, No. 2, p. 212**

Design brochure for commercially-available solar-heating system is valuable to architects, engineers, and designers. It contains information on system configuration, system sizing, and mechanical layout. Drawings and specifications of all components and typical installation details are included in appendix.

**B78-10194**

#### **PROTOTYPE SOLAR-HEATING SYSTEM-ENGINEERING ANALYSIS**

Innovator not given (IBM Corp.) Oct. 1978 See also NASA CR-150522 (N78-18527) B78-10180; B78-10195

**M-FS-23910**

**Vol. 3, No. 2, p. 213**

Space and domestic-water solar-heating prototype was tested in three phases: simulated energy function, winter normal operation, summer normal operation. Prototype was judged suitable for field installation.

**B78-10195**

#### **PROTOTYPE SOLAR-HEATING SYSTEM - INSTALLATION MANUAL**

Innovator not given (IBM Corp.) Oct. 1978 See also NASA CR-150524 (N78-18523); B78-10180; B78-10194

**M-FS-23907**

**Vol. 3, No. 2, p. 213**

Manual for prototype solar-heating system gives detailed installation procedures for each of seven subsystems. Procedures for operation and maintenance are also included. It discusses architectural considerations, building construction considerations, and checkout-test procedures.

**B78-10196**

#### **SOLAR-HEATING MODULE**

D. L. CHRISTENSEN (Alabama Univ.) Oct. 1978

**M-FS-23925**

**Vol. 3, No. 2, p. 213**

Comprehensive set of engineering drawings and instructions for installation, operation, repair, and maintenance are available for module that provides hot-air or hot-water needs for residence or commercial building. It can accommodate solar collectors of various sizes and types. It can provide utility, workshop, or storage space, in addition to providing hot water or hot air. Extensive insulation minimizes heat losses in structure and in storage and fluid-handling subsystems.

**B78-10197**

#### **PASSIVE HEAT EXCHANGER FOR SOLAR HEATING**

Innovator not given (Sigma Research, Inc.) Oct. 1978 See also NASA CR-150516 (N78-18522); B78-10198

**M-FS-23914**

**Vol. 3, No. 2, p. 214**

Requirements for design, manufacture, installation, and performance of passive heat-exchanger module with auxiliary heaters for use with solar-heating systems are described.

**B78-10198**

#### **PASSIVE HEAT EXCHANGER - INSTALLATION PACKAGE**

Innovator not given (Sigma Research, Inc.) Oct. 1978 See also NASA CR-150512 (N78-20602); B78-10197

**M-FS-23930**

**Vol. 3, No. 2, p. 214**

Package covers installation, operation, and maintenance of heat exchanger which has auxiliary heaters that provide backup heat in inclement weather. Drawings, including schematics, complement text material, which is organized as step-by-step

instructions. Trouble-shooting section discusses probable causes and repairs for most common difficulties.

**B78-10199**

#### **PROTOTYPE AIR FLAT-PLATE SOLAR COLLECTOR**

Innovator not given (Life Sciences Engineering) Oct. 1978 See also NASA CR-150514 (N78-17479); B78-10200

**M-FS-23893**

**Vol. 3, No. 2, p. 214**

Four reports trace development from preliminary design through delivery of hardware. Developmental test, including airflow, air temperature, and efficiency are discussed in reports, as are qualification tests on prototypes and final acceptance tests. Qualification test program includes measurements tests, and structural analysis.

**B78-10200**

#### **FLAT-PLATE SOLAR COLLECTOR - INSTALLATION PACKAGE**

Innovator not given (Life Sciences Engineering) Oct. 1978 See also NASA CR-150536 (N78-19605); B78-10199

**M-FS-23921**

**Vol. 3, No. 2, p. 214**

Package includes installation, operation and maintenance manual for collector, analysis of safety hazards, special handling instructions, materials list, installation drawings, and warranty and certification statement. Manual includes instructions for roof preparation and for preparing collector for installation. Several pages are devoted to major and minor repairs.

**B78-10201**

#### **TESTING OF THREE HOT-AIR SOLAR COLLECTORS**

R. LOSEY (Wyle Laboratories)

Oct. 1978 See also NASA CR-150495 (N78-17471)

**M-FS-23887**

**Vol. 3, No. 2, p. 215**

Report presents procedures used and results obtained during program to determine pressure drops across three prototype hot-air solar collectors as function of air velocity and operating temperature.

**B78-10202**

#### **THERMAL PERFORMANCE OF A HOT-AIR SOLAR COLLECTOR**

J. CHIOU (Wyle Laboratories)

Oct. 1978 See also NASA CR-150509 (N78-17478)

**M-FS-23891**

**Vol. 3, No. 2, p. 215**

Series of tests evaluated thermal performance of hot-air solar collector. Evaluation included time constant, collector-efficiency, collector-stagnation, properties tests.

**B78-10203**

#### **PERFORMANCE AND STRUCTURAL TESTS OF HOT-AIR SOLAR COLLECTORS**

K. SHIH (Wyle Laboratories)

Oct. 1978 See also NASA CR-150506 (N78-18525)

**M-FS-23911**

**Vol. 3, No. 2, p. 215**

Report describes program to determine thermal performance and structural characteristics of selected hot-air collectors in both real and simulated environmental conditions.

**B78-10204**

#### **THERMAL PERFORMANCE OF A HOT-AIR SOLAR COLLECTOR**

Innovator not given (Wyle Laboratories) Oct. 1978 See also NASA CR-150572 (N78-19652)

**M-FS-23924**

**Vol. 3, No. 2, p. 216**

Report contains procedures and results of thermal-performance tests on double-glazed air solar collector. Four types of tests were carried out including thermal-efficiency and stagnation tests, collector time-constant tests to assess effects of transients, and incident-angle modifier tests. Data are presented in tables and as graphs and are discussed and analyzed.

**B78-10205**

#### **FLAT-PLATE LIQUID SOLAR COLLECTOR**

K. SHIH (Wyle Laboratories)

Oct. 1978 See also NASA CR-150511 (N78-18521)

**M-FS-23912**

**Vol. 3, No. 2, p. 216**

Report presents test procedures and results of program to obtain thermal performance data on liquid, incident-angle-modifier, heat-loss-coefficient, and stagnation tests.

**B78-10206**  
**PERFORMANCE EVALUATIONS OF A LIQUID SOLAR COLLECTOR**

K. SHIH (Wyle Laboratories)  
Oct. 1978 See also NASA CR-150573 (N78-19650)  
**M-FS-23931** Vol. 3, No. 2, p. 216

Report presents procedures and results of thermal performance tests on single-covered liquid solar collector under simulated conditions. Test conditions and data are given in tables and graphs for stagnation tests and thermal performance test. In addition, time-constant test and incident-angle modifier test were conducted to determine transient effect and incident-angle effect. Results of collector load tests are also given.

**B78-10207**  
**INDOOR AND OUTDOOR TESTS OF A LIQUID SOLAR COLLECTOR**

R. LOSEY (Wyle Laboratories) and K. SHIH (Wyle Laboratories)  
Oct. 1978 See also NASA CR-150505 (N78-17472); NASA CR-150507 (N78-17473)  
**M-FS-23886** Vol. 3, No. 2, p. 217

Two reports describe thermal-performance data obtained on double-covered liquid solar collector. One report describes data obtained during outdoor testing and the other describes indoor test data obtained by using Marshall Space Flight Center solar simulator. Indoor data were taken to verify performance of solar simulator.

**B78-10208**  
**THERMAL PERFORMANCE OF A FLAT-PLATE LIQUID SOLAR COLLECTOR**

K. SHIH (Wyle Laboratories)  
Oct. 1978 See also NASA CR-150508  
**M-FS-23890** Vol. 3, No. 2, p. 217

Report presents procedures and results of a program to obtain thermal performance data on double-covered liquid solar collectors.

**B78-10209**  
**CORROSION INHIBITORS FOR SOLAR HEATING AND COOLING SYSTEMS**

J. H. TABONY (Southern Univ.)  
Oct. 1978 See also NASA CR-150575 (N78-17475)  
**M-FS-23892** Vol. 3, No. 2, p. 217

Candidate materials were tested for their ability to limit corrosion under conditions that approximate those found in typical solar-energy system. In addition to presentation of data, report also includes discussion of different forms of corrosion and recommendations for future work.

**B78-10210**  
**PERFORMANCE OF BLACK-NICKEL AND BLACK-CHROME SOLAR COLLECTORS**

R. LOSEY (Wyle Laboratories)  
Oct. 1978 See also NASA CR-150497 (N78-17470)  
**M-FS-23888** Vol. 3, No. 2, p. 218

Report presents procedures used and results obtained during tests to determine comparative efficiency of black-nickel and black-chrome solar-collecting surfaces.

**B78-10211**  
**MEASURING METALLIC CONCENTRATIONS IN GLYCOL SOLUTIONS**

Innovator not given (Houston Chemical Co.) Oct. 1978 See also NASA CR-150520 (N78-17174)  
**M-FS-23894** Vol. 3, No. 2, p. 218

A study of atomic absorption spectroscopy as a possible nonobtrusive corrosion indicator for solar-energy systems is described. Procedures were tested for determining low levels of metallic concentration in aqueous glycol formulations. Other methods for determining corrosion are suggested.

**B78-10212**  
**GLASS SOLAR COLLECTOR - MATERIALS ASSESSMENT**

R. L. NICHOLS  
Oct. 1978 See also NASA TM-78163 (N78-21597)  
**M-FS-23926** Vol. 3, No. 2, p. 218

Comprehensive series of tests evaluates design, materials, and failure modes of commercially-available glass solar-collector system. Results of materials analysis segment of program are presented to report.

**B78-10213**  
**PUMP EFFICIENCY IN SOLAR-ENERGY SYSTEMS**

Innovator not given (Tennessee Tech. Univ.) Oct. 1978 See also NASA CR-150604 (N78-20617)  
**M-FS-23934** Vol. 3, No. 2, p. 219

Study investigates characteristics of typical off-the-shelf pumping systems that might be used in solar systems. Report includes discussion of difficulties in predicting pump efficiency from manufacturers' data. Sample calculations are given. Peak efficiencies, flow-rate control, and noise levels are investigated. Review or theory of pumps types and operating characteristics is presented.

**B78-10214**  
**THE ECONOMICS OF SOLAR POWERED ABSORPTION COOLING**

J. C. BARTLETT (IBM Corp.)  
Oct. 1978 See also NASA CR-150533 (N78-18524)  
**M-FS-23908** Vol. 3, No. 2, p. 219

Analytic procedure evaluates cost of combining absorption-cycle chiller with solar-energy system in residential or commercial application. Procedure assumes that solar-energy system already exists to heat building and that cooling system must be added. Decision is whether to cool building with conventional vapor-compression-cycle chiller or to use solar-energy system to provide heat input to absorption chiller.

**B78-10215**  
**APPLICATION OF SOLAR ENERGY TO AIR-CONDITIONING**

A. J. HARSTAD (IBM Corp.) and J. M. NASH (IBM Corp.)  
Oct. 1978 See also NASA CR-150532 (N78-17483)  
**M-FS-23913** Vol. 3, No. 2, p. 220

Results of survey of application of solar energy to air-conditioning systems are summarized in report. Survey reviewed air-conditioning techniques that are most likely to find residential applications and that are compatible with solar-energy systems being developed.

**B78-10318**  
**'PSEUDOBACKSCATTER' LASER VELOCIMETER**

W. D. GUNTHER  
Jan. 1979  
**ARC-10970** Vol. 3, No. 3, p. 343

Laser instrument measures speed of fluid flow with sensitivity of forward-scatter velocimeter and convenience of back scatter device. Velocimeter uses corner-cube reflector to return scattered laser beam to source. Device measures airflow around aircraft and in wind tunnels or other fluid-flow measurement applications.

**B78-10319**  
**SIGNAL-INTERLEAVING DEVICE**

J. R. FISCHER  
Jan. 1979  
**GSFC-12111** Vol. 3, No. 3, p. 344

Interleaving devices combine and duplicate optical electronic and other energy-saving signals in signal processing applications necessary for recording heads in interconnecting logic elements in computers and in data transmission systems. Simple cubic interleaver is characterized by high energy transmission and potentiality for low cost fabrication, and is designed to be easily interconnected with other signal processing elements.

**B78-10320**  
**COMMON-CAVITY PUMPED LASER**

G. A. KOEPF (NASA)  
Jan. 1979

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#### GSFC-12237

Vol. 3, No. 3, p. 345

Two lasers linked by dichroic coupler are packaged in single cavity. Resulting system is more compact, efficient, and durable than conventional two-cavity lasers. Such instruments (portable pumped lasers) are needed for spectroscopy in plasma diagnostics in atmospheric research, and in radar-like devices for seeing through dense fog or smoke.

#### B78-10321

##### MEASURING SURFACE DISPLACEMENTS OPTICALLY

R. B. OWEN

Jan. 1979

#### M-FS-23861

Vol. 3, No. 3, p. 346

Laser system measures changes in position or roughness of surface without physical contact. Using optical correlation technique, displacement of surface is measured by reflection of laser beam and holographic correlation filtering system. System also determines changes in roughness or shape of surface.

#### B78-10322

##### COSINE-CORRECTED OPTICAL DIFFUSER

R. S. ESTEY

Jan. 1979

#### NPO-14288

Vol. 3, No. 3, p. 347

In solar energy utilization studies, correct measurements of flux arriving at other angles to optical axis must be given. Developed device (Cosine diffuser) significantly reduces measurement errors. In combination of radiation transmitter and diffuser co-operating with collimated optical instrument, relative aperture of instrument is filled.

#### B78-10323

##### VACUUM-ULTRAVIOLET LASER USES SUPERFLUID HELIUM

J. S. ZMUIDZINAS

Jan. 1979

#### NPO-13993

Vol. 3, No. 3, p. 348

Vacuum ultra violet laser in wavelength around 0.800 microns is produced by using optical pumping to increase lifetimes of excited metastable molecules in super fluid helium. In method, super fluid helium is pumped electronically to produce excited HE2, and then pumped by circularly polarized 0.9096 - micron radiation to align excited HE2 molecular spins. High power ultraviolet radiation has potential applications in molecular reaction studies, power transmission in space, and biomedical research.

#### B78-10324

##### SOLAR-POWERED HOT-WATER SYSTEM

E. R. COLLINS

Jan. 1979

#### NPO-14270

Vol. 3, No. 3, p. 349

Hot-water system requires no external power except solar energy. System is completely self-controlling. It includes solar-powered pump, solar-thermally and hydrothermally operated valves, and storage tank filled with open-celled foam, to maintain thermal stratification in stored water.

#### B78-10325

##### THIN SILICON-SOLAR CELL FABRICATION

J. LINDMAYER (Solarex Corp.)

Jan. 1979

#### NPO-14047

Vol. 3, No. 3, p. 350

Flexible silicon slices of uniform thicknesses are fabricated by etching in sodium hydroxide solution. Maintaining uniform thickness across slices during process(fabrication) is important for cell strength and resistance to damage in handling. Slices formed by procedure have reproducible surface with fine orange peel texture, and are far superior to slices prepared by other methods.

#### B78-10326

##### NATURAL-OXIDE SOLAR-COLLECTOR COATINGS

A. C. KRUPNICK, M. L. ROBERTS, and M. H. SHARPE

Jan. 1979

#### M-FS-23518

Vol. 3, No. 3, p. 350

Optically selective coatings for solar collectors are produced

by thermally treating stainless steel in furnace after series of cleaning and soaking operations. Coatings have withstood 18-month exposure tests at 100 percent relative humidity and temperatures of 95 F. Room temperature coatings are valuable as they are inexpensive to produce, highly production oriented, and environmentally stable.

#### B78-10327

##### MOUNTING PROCEDURE FOR GEOLOGICAL SAMPLES

D. I. JEZEK (Northrop Corp.)

Jan. 1979

#### MSC-18206

Vol. 3, No. 3, p. 351

Mounting procedure originally developed for lunar samples preserves geological specimens. Sequence of potting and grinding operations produces thin sections through grains that are easy to handle and are well protected for storage. Method results in more representative sections of mixture of grains of different sizes and more effective distribution of grains uniformly over slide.

#### B78-10328

##### MODULAR HEAT-PIPE-RADIATOR PANEL

J. ALARIO (Grumman Aerospace Corp.)

Jan. 1979

#### MSC-16625

Vol. 3, No. 3, p. 352

Heat-Pipe panel assembled by joining series of Heat-Pipe modules is presented. Each module is identical and includes own radiator Fin and Fluid-Header section. Arrangement gives high turn-down ratio permitting ammonia heat pipes to freeze under low conditions.

#### B78-10329

##### ESTIMATING REGIONAL HEAT FLUX FROM SCANNING RADIOMETER DATA

T. D. BESS and G. L. SMITH

Jan. 1979

#### LANGLEY-12158

Vol. 3, No. 3, p. 353

Method using matrix approach to determine best linear estimate of total flux consistent with condition of minimum variance proves useful in meteorological studies. It is useful for researchers studying options in scanner design such as scan pattern, scan rate, and radiometer field-of-view.

#### B78-10330

##### ENERGY CONVERSION ALTERNATIVES STUDY

L. T. SHURE

Jan. 1979 See also NASA-TM-73871 (N78-24659)

#### LEWIS-13096

Vol. 3, No. 3, p. 353

Comparison of coal based energy systems is given. Study identifies and compares various advanced energy conversion systems using coal or coal derived fuels for baseload electric power generation. Energy Conversion Alternatives Study (ECAS) reports provide government, industry, and general public with technically consistent basis for comparison of system's options of interest for fossil-fired electric-utility application.

#### B78-10331

##### PROBLEMS ENCOUNTERED IN SOLAR HEATING AND COOLING SYSTEMS

M. CASH

Jan. 1979 See also NASA TM-78172 (N78-25539)

#### M-FS-23974

Vol. 3, No. 3, p. 354

Report discussing various experiences of workers at Marshall Space Flight Center in developing solar heating and cooling systems is presented. Presents compilation of problems and their resolutions which can assist designers of solar-energy systems and prevent repetition of errors.

#### B78-10332

##### PROTOTYPE SOLAR-HEATING SYSTEM DESIGN PACKAGE

Innovator not given (IBM) Jan. 1979 See also NASA-CR-150614 (N78-21589)

#### M-FS-23945

Vol. 3, No. 3, p. 355

Design package for complete residential solar-heating system is given. Includes documents and drawings describing performance



design, verification standards, and analysis of system with sufficient information to assemble working system.

**B78-10333****PROTOTYPE RESIDENTIAL SOLAR-ENERGY SYSTEM-DESIGN PACKAGE**

Innovator not given (IBM) Jan. 1979 See also NASA-CR-15052 (N78-22465); B78-10192

**M-FS-23953****Vol. 3, No. 3, p. 355**

Compilation includes documents and drawings for complete solar-heating system. It discussed system installed in residential building at Veterans' Administration Hospital in Togus, Maine. System can be adapted to other buildings without changing design.

**B78-10334****PROTOTYPE RESIDENTIAL SOLAR-ENERGY SYSTEM-INSTALLATION PACKAGE**

Innovator not given (IBM) Jan. 1979 See also NASA-CR-150639 (N78-22474)

**M-FS-23956****Vol. 3, No. 3, p. 355**

Installation guidelines for architects and engineers discussing solar-heating system built in Togus, Maine are presented. Includes brief, functional description of system and summary of operation. Drawings complement text.

**B78-10335****HOT-AIR FLAT-PLATE SOLAR COLLECTOR-DESIGN PACKAGE**

Innovator not given (Life Sciences Engineering) Jan. 1979 See also NASA-CR-150611 (N78-21602)

**M-FS-23941****Vol. 3, No. 3, p. 355**

Report contains design data, performance specifications, and drawings for hot-air flat-plate solar-energy collector. Evaluation consists of tests on thermal performance time constance, and incidence angle modifier test. Results are presented in table and graph form and are analyzed in detail.

**B78-10336****EVALUATION OF AN AIR SOLAR COLLECTOR**

Innovator not given (Wyle Labs., Inc.) Jan. 1979 See also NASA-CR-150665 (N78-25547)

**M-FS-23978****Vol. 3, No. 3, p. 356**

Performance verification under simulated conditions tested by using Marshall Space Flight Center solar simulator is presented. Evaluation included thermal performance tests, time constant tests, and incident angle modifier tests.

**B78-10337****INDOOR TESTS OF A HOT-AIR SOLAR COLLECTOR**

Innovator not given (Wyle Labs., Inc.) Jan. 1979 See also NASA-CR-150631 (N78-22466)

**M-FS-23954****Vol. 3, No. 3, p. 356**

Data taken relating indoor testing using solar simulator at Marshall Space Center has been compared with data taken during outdoor tests in previous studies. Data includes tests on thermal performance, time constance, and incidence-angle modifier tests in table/graph form.

**B78-10338****PERFORMANCE EVALUATION OF AN AIR SOLAR COLLECTOR**

Innovator not given (Wyle Labs., Inc.) Jan. 1979 See also NASA-CR-150666 (N78-24613)

**M-FS-23968****Vol. 3, No. 3, p. 356**

Indoor tests on signal-glazed flat-plate collector are described in report. Marshall Space Flight Center solar simulator is used to make tests. Test included evaluations on thermal performance under various combinations of flow rate, incident flux, inlet temperature, and wind speed. Results are presented in graph/table form.

**B78-10339****OUTDOOR TESTS OF A LIQUID SOLAR COLLECTOR**

Innovator not given (Wyle Labs., Inc.) Jan. 1979 See also NASA-CR-150675 (N78-24614)

**M-FS-23969****Vol. 3, No. 3, p. 357**

Results of outdoor test program evaluating thermal performance of liquid solar collector are presented in report. Test article used is flatplate collector with antifreeze solution as working fluid.

**B78-10340****POWER LOSS FOR HIGH-VOLTAGE SOLAR-CELL ARRAYS**

L. W. PARKER (Lee W. Parker, Inc.)

Jan. 1979

**LEWIS-12865****Vol. 3, No. 3, p. 357**

Electric field particle collection and power loss are calculated in program written in FORTRAN IV for use on UNIVAC 1100/40 computer. Program incorporates positive and negative and negative charge flows and balance between positive and negative flows is performed by iteration.

**B78-10341****OCEAN-WAVE RAY OR CREST DIAGRAMS IN SHOALING WATERS**

W. D. MORRIS, L. R. POOLE, and S. R. LECROY (Vought Corp.)

Jan. 1979

**LANGLEY-12380****Vol. 3 No. 3, p. 357**

Program developed to aid studies of linear ocean-wave refraction features random-access modular storage of bathymetry data to minimize computer resource requirements. Program is study tool used to forecast ocean conditions for ship routing and offshore activities. It also allows very large geographical regions to be studied with fewer computer resources, but does not restrict applicability of model to smaller areas.

**B78-10477****SOLAR SIMULATOR TEST FACILITY**

W. R. HUMPHRIES

Mar. 1979 See also NASA-TM-78165 (N78-21605)

**M-FS-23972****Vol. 3, No. 4, p. 507**

Discusses facility constructed at Marshall Space Flight Center to evaluate performance of solar energy collectors under simulated outdoor conditions. Facility simulates sunfall properties such as radiation intensity, spectrum, collimation, uniformity, and direction.

**B78-10478****VOLTAGE REGULATOR FOR SOLAR PANELS**

T. A. CASAD

Mar. 1979

**NPO-13895****Vol. 3, No. 4, p. 508**

Shunt voltage regulators for solar panels uses internal resistance of panel to control its output voltage. Regulator can be scaled up for high-current solar panels by adding more transistors.

**B78-10479****MORE EFFICIENT GAAS SOLAR CELLS**

W. TANTRAPORN

Mar. 1979

**LANGLEY-12216****Vol. 3, No. 4, p. 509**

Electron-hole pair production in space charge layer converts nearly 100 percent of photogenerated carriers to useful current. Short life problem is eliminated.

**B78-10480****INFRARED SCANNERS DETECT THERMAL GRADIENTS IN BUILDING WALLS**

A. G. KANTSIOS

Mar. 1979

**LANGLEY-12157****Vol. 3, No. 4, p. 510**

Presents study on ability of infrared scanner used to detect thermal gradients in outside walls of two homes in Virginia Beach, Virginia under joint effort of Langley Research Center, Virginia Energy Office and Virginia Beach Energy Conservation Pilot Project. Details how study can be used to help minimize energy loss.

**B78-10481****SOLAR-POWERED HOT-AIR SYSTEM**

Innovator not given (Solar Engineering and Equipment Co.) Mar. 1979

**M-FS-23976****Vol. 3, No. 4, p. 511**

### 03 PHYSICAL SCIENCES

Solar-powered air heater supplies part or all of space heating requirements of residential or commercial buildings and is interfaced with air to water heat exchanger to heat domestic hot water. System has potential application in drying agricultural products such as cotton, lumber, corn, grains, and peanuts.

**B78-10482**

#### **OCEAN THERMAL PLANT**

L. J. OWENS

Mar. 1979

**KSC-11034**

**Vol. 3, No. 4, p. 512**

Modular Ocean Thermal-Energy Conversion (OTEC) plant permits vital component research and testing and serves as operational generator for 100 megawatts of electric power. Construction permits evaporators and condensers to be tested in same environment in which they will be used, and could result in design specifications for most efficient plant facilities in future.

**B78-10483**

#### **WIND/WATER ENERGY CONVERTER**

J. PAULKOVICH

Mar. 1979

**GSFC-12361**

**Vol. 3, No. 4, p. 513**

Device will convert wind, water, tidal or wave energy into electrical or mechanical energy. Is comprised of windmill-like paddles or blades synchronously geared to orient themselves to wind direction for optimum energy extraction.

**B78-10484**

#### **THERMOELECTRICALLY-COOLED VARIABLE-TEMPERATURE PROBE**

R. M. KELSO and R. G. RICHMOND

Mar. 1979

**MSC-18192**

**Vol. 3, No. 4, p. 514**

Variable-temperature probe for electron spectroscopy requires no cryogenic liquids or resistance heating elements. Device consists of heat sink, probe tip, and nickel-plated copper body which resists oxidation and transfers heat efficiently between tip and heat sink.

**B78-10485**

#### **IMPROVED FOURIER INTERFERENCE SPECTROMETER**

R. A. SCHINDLER

Mar. 1979

**NPO-14025**

**Vol. 3, No. 4, p. 515**

Proposed system compensates for velocity changes by multiplying detector output by signal proportional to scan velocity. Increases in velocity are compensated by increase signal from velocity circuit and decreases in velocity are offset by smaller signal from circuit thereby making output signal velocity independent.

**B78-10486**

#### **LOW-POWER TUNER FOR LASERS**

S. LEVINSON (United Aircraft Corp.)

Mar. 1979

**M-FS-23863**

**Vol. 3, No. 4, p. 516**

Magnetic transducers tunes laser by making small precise adjustments in length of laser resonant cavity. Device is simple and stable structure consisting of electromagnet pulling on spring supported magnetic plate.

**B78-10487**

#### **DIFFRACTOID X-RAY FOCUSING**

S. O. KASTNER

Mar. 1979

**GSFC-12357**

**Vol. 3, No. 4, p. 516**

Presents aspheric concave diffraction surface that is able to focus sharply single wavelength of x-ray or ultraviolet radiation which may originate from either nearby or far-distant source.

**B78-10488**

#### **IMPROVED SERVO FOR A MICHAELSON INTERFEROMETER**

R. A. SCHINDLER

Mar. 1979

**NPO-14093**

**Vol. 3, No. 4, p. 517**

Simplified constant-velocity servosystem for continuous-scan interferometer replaces earlier more complex system designed for atmospheric sampling experiments.

**B78-10489**

#### **INSTRUMENT MEASURES MANY OPTICAL PROPERTIES IN VISIBLE AND IR**

C. E. BATTEN

Mar. 1979

**LANGLEY-12285**

**Vol. 3, No. 4, p. 518**

Electro-optical system measures reflectance, reflectance ratio, transmission, absorption, refractive index, and absorption coefficient in both visible and infrared (IR) spectral regions. System effectively combining capabilities of ellisometer, reflectometer, and spectrophotometer is expected to find application in environmental and material composition testing fields.

**B78-10490**

#### **HYDROGEN-MASER FREQUENCY STANDARD**

V. REINHARDT and P. CERVENKA (Phoenix Corp.)

Mar. 1979

**GSFC-12334**

**Vol. 3, No. 4, p. 519**

Wall shift in frequency of proposed variable-shift maser that is caused by collisions between hydrogen atoms and container walls, could easily be determined, thereby allowing building of frequency standard with accuracy of 1 part in 10 to 14th power.

**B78-10491**

#### **ULTRATHIN FILMS AS PHOTOMECHANICAL TRANSDUCER**

R. F. FEDORS and M. N. SARBOLOUKI

Mar. 1979

**NPO-14363**

**Vol. 3, No. 4, p. 520**

Stretched ultrathin, metallized polyimide film is used as photochemical transducer for detection and measurement of total exposure to light. Film is potential nonelectrical replacement for solar cells.

**B78-10492**

#### **SOLAR-HEATING SYSTEM DESIGN DATA BROCHURE**

Innovator not given (Federal Systems Division of IBM Corp.) Mar. 1979

**M-FS-23977**

**Vol. 3, No. 4, p. 521**

Report details design and performance specifications of complete system for space and hot-water heating that is assembled from commercially available components. System can meet need of single family dwelling having approximately 1,200 sq ft of floor area and can be scaled to requirements of larger or smaller installations.

**B78-10493**

#### **SOLAR-HEATING SYSTEM PERFORMANCE TESTS**

Innovator not given (Federal Systems Division of IBM Corp.) Mar. 1979

**M-FS-25021**

**Vol. 3, No. 4, p. 522**

Report contains results of performance tests on complete system for solar space and hot-water heating system that uses commercially available components. Results were used to determine system suitability for field installation and to generate performance data base for comparison with future tests on field installed systems.

**B78-10494**

#### **SOLAR-HEATING SYSTEM**

Innovator not given (Federal Systems Division of IBM Corp.) Mar. 1979

**M-FS-25022**

**Vol. 3, No. 4, p. 522**

Report describes solar modular domestic-hot-water and space-heating system intended for use in small single family dwelling where roof-mounted collectors are not feasible. Contents include design, performance, and hardware specifications for assembly, installation, operation, and maintenance of system.

**B78-10495****SOLAR HOT-WATER SYSTEM**

Innovator not given (Solar Engineering and Manufacturing Co.) Mar. 1979

**M-FS-25043****Vol. 3, No. 4, p. 522**

Design data brochure describes domestic solar water system that uses direct-feed system designed to produce 80 gallons of 140 F hot water per day to meet needs of single family dwelling. Brochure also reviews annual movements of sun relative to earth and explains geographic considerations in collector orientation and sizing.

**B78-10496****RESIDENTIAL SOLAR-HEATING SYSTEM-DESIGN PACKAGE**

Innovator not given (Solafern Ltd.) Mar. 1979

**M-FS-25071****Vol. 3, No. 4, p. 523**

Design package for modular solar heating system includes performance specifications, design data, installation guidelines, and other information that should be valuable to those interested in system (or similar systems) for projected installation. When installed in insulated 'energy saver' home, system can supply large percentage of total energy needs of building.

**B78-10497****DEVELOPMENT AND TESTING OF A HOT-AIR SOLAR COLLECTOR**

J. M. CAUDLE

Mar. 1979

**M-FS-23997****Vol. 3, No. 4, p. 523**

Summarized report on development and testing of hot-air flat-plate solar collector includes structural details, coating selection, and spacing between coating and glass plate. Report gives complete performance specifications and extensive certifications test report.

**B78-10498****DESIGN AND INSTALLATION OF A FLAT-PLATE SOLAR COLLECTOR**

Innovator not given (Calmac Manufacturing Co.) Mar. 1979 See also M-FS-25082 (B78-10499)

**M-FS-25010****Vol. 3, No. 4, p. 523**

Report presents performance, installation, operation, and maintenance information for flat-plate liquid solar energy collector. Methods for determining optimum collector sizing are described as well.

**B78-10499****LIQUID SOLAR COLLECTOR-PERFORMANCE TESTS**

Innovator not given (Calmac Manufacturing Co.) Mar. 1979 See also M-FS-25010 (B78-10498)

**M-FS-25082****Vol. 3, No. 4, p. 524**

Report describes comprehensive performances test on commercially-available modular nonmetallic single-glazed liquid solar collector to verify compliance with U. S. Housing and Urban Development Department standards for thermal stability. Program includes tests of initial thermal performance, 30 day stagnation, and final external performance.

**B78-10500****CONCENTRATING SOLAR COLLECTOR-INSTALLATION PACKAGE**

Innovator not given (Northrup Corp.) Mar. 1979

**M-FS-25068****Vol. 3, No. 4, p. 524**

Report contains general description of concentrating solar collector and tracking system kit, along with comprehensive drawings, instructions, and guidelines to assist in field assembly, installation, operation, and maintenance of system.

**B78-10501****CORROSION INHIBITORS FOR SOLAR-HEATING AND COOLING**

T. S. HUMPHRIES

Mar. 1979

**M-FS-25023****Vol. 3, No. 4, p. 525**

Report describes results of tests conducted to evaluate abilities

of 12 candidate corrosion inhibitors to protect aluminum, steel, copper, or stainless steel at typical conditions encountered in solar heating and cooling systems. Inhibitors are based on sodium salts including nitrates, borates, silicates, and phosphates.

**B78-10502****CHEMICAL-VAPOR DEPOSITION OF SILICON FROM SILANE**

G. C. HSU, R. LUTWACK, and A. K. PRATURI

Mar. 1979 See also NASA-CR-155044 (N77-32265)

**NPO-14403****Vol. 3, No. 4, p. 525**

Report lists tables of standard free-energy change, equilibrium constant, and heat of reaction for chemical vapor deposition (CVD) of silicon from silane over temperature range of 100 to 1000 K. Data indicates silicon CVD may be a commercially economical process for production of silicon for solar arrays and other applications.

**B78-10503****MULTIDIMENSIONAL HISTOGRAMS**

R. R. JAYROE, JR.

Mar. 1979

**M-FS-23855****Vol. 3, No. 4, p. 526**

Program computes four dimensional histogram of Landsat multispectral image data. System enhances image handling and significantly reduces reprocessing costs.

## 04 MATERIALS

**B78-10038****MICROBIAL DESULFURIZATION OF COAL**

M. N. DASTOOR and J. J. KALVINSKAS

Jun. 1978

**NPO-14227****Vol. 3, No. 1, p. 47**

Experiments indicate that several sulfur-oxidizing bacteria strains have been very efficient in desulfurizing coal. Process occurs at room temperature and does not require large capital investments of high energy inputs. Process may expand use of abundant reserves of high-sulfur bituminous coal, which is currently restricted due to environmental pollution. On practical scale, process may be integrated with modern coal-slurry transportation lines.

**B78-10039****HYDROGEN ENRICHMENT OF SYNTHETIC FUEL**

C. G. JAY (Inst. of Gas Tech.)

Jun. 1978

**M-FS-23279****Vol. 3, No. 1, p. 47**

Synthetic gas may be produced at lower cost and higher efficiency by using outside source of hydrogen. Method is compatible with same temperatures and pressures as shift reaction. Process increases efficiency by using less coal and water to provide equal amount of synthetic gas.

**B78-10040****POLYIMIDE ADHESIVES FOR TITANIUM AND COMPOSITE BONDING**

A. K. ST. CLAIR and T. L. ST. CLAIR

Jun. 1978

**LANGLEY-12257****Vol. 3, No. 1, p. 48**

Approach results in synthesis of addition polyimide adhesives with exceptional high temperature capabilities that show excellent potential for bonding titanium metal, polyimide/graphite composites, and combinations of these materials. Adhesives compatible with materials used in high performance aircraft and spacecraft structures also prove highly desirable in many other applications involving similar adherents.

**B78-10041****FLAME-RETARDANT ADHESIVE TAPE**

#### 04 MATERIALS

Innovator not given (Arthur D. Little, Inc.) Jun. 1978 See also NASA CR-151224 (N77-19251)

**MSC-16721** Vol. 3, No. 1, p. 49  
Nonflammable tape adheres well, can be written on, and has other properties making it extra-safe general-purpose tape.

**B78-10042**  
**NEW ADHESIVE WITHSTANDS TEMPERATURE EXTREMES**  
J. J. PARK and B. SEIDENBERG  
Jun. 1978

**GSFC-12345** Vol. 3, No. 1, p. 50  
Adhesive, developed for high-temperature components aboard satellites, is useful at both high and low temperatures and exhibits low-vacuum volatility and low shrinkage. System uses polyfunctional epoxy with high aromatic content, low equivalent weight, and more compact polymer than conventional bisphenol A tape.

**B78-10043**  
**BORON TRIFLUORIDE COATINGS FOR PLASTICS**  
R. M. KUBACKI (Bell & Howell Co.)  
Jun. 1978

**ARC-11057** Vol. 3, No. 1, p. 51  
Tough, durable coatings of boron trifluoride can be deposited on plastic optical components to protect them from destructive effects of abrasion, scratching, and environment. Coating material can be applied simultaneously with organic polymers, using plasma glow-discharge methods, or it can be used as base material for other coatings to increase adhesion.

**B78-10044**  
**ELECTRICALLY-CONDUCTING THERMAL-CONTROL COATING**  
M. C. SHAI  
Jun. 1978

**GSFC-12207** Vol. 3, No. 1, p. 52  
Coating comprised mainly of zinc and aluminum oxides is characterized by high thermal emittance, low thermal absorption, and high electrical conductivity. Originally developed to protect spacecraft, coating can be used to prevent charge buildup on components in other applications. Mixture is stable under ultraviolet and X-ray radiation and under bombardment by ionizing particles. It can be applied to aluminum, stainless steel, epoxy/fiberglass, and other substrates. When exposed to equivalent of 1,000 Sun-hours illumination, coating remained stable and retained its optical properties.

**B78-10045**  
**WROUGHT NICKEL-BASE SUPERALLOY**  
R. V. MINER, F. H. HARF, and W. B. KENT (Universal Cyclops Corp.)  
Jun. 1978 See also B74-10002; B74-10003; NASA-CR-135131 (N77-20208)

**LEWIS-12844** Vol. 3, No. 1, p. 52  
Superalloy for advanced temperature use is suited to cost-saving powder-metallurgy manufacturing methods and has improved phase stability during longtime heating. Wide variety of applications exists where stainless steels are used for oxidation and/or corrosion resistance.

**B78-10046**  
**LOW-CHROMIUM STAINLESS STEELS**  
C. A. BARRETT, C. A. GYORGAK, and J. R. STEPHENS  
Jun. 1978 See also NASA-TN-D-8459 (N77-23241)

**LEWIS-12543** Vol. 3, No. 1, p. 53  
Two modified stainless-steel formulations, with only two-thirds chromium content found in conventional type 304, have mechanical and chemical properties comparable to type 304. Low-chromium stainless steels have potential uses in heat exchangers, transfer lines for chemicals, automobile trim, and other applications.

**B78-10047**  
**MODIFIED CHEMILUMINESCENT NO ANALYZER ACCURATELY MEASURES NOX**  
R. L. SUMMERS  
Jun. 1978 See also NASA-TM-X-73480 (N76-30319)

**LEWIS-12850** Vol. 3, No. 1, p. 54  
Installation of molybdenum nitric oxide (NO)-to-higher oxides of nitrogen (NOx) converter in chemiluminescent gas analyzer and use of air purge allow accurate measurements of NOx in exhaust gases containing as much as thirty percent carbon monoxide (CO). Measurements using conventional analyzer are highly inaccurate for NOx if as little as five percent CO is present. In modified analyzer, molybdenum has high tolerance to CO, and air purge substantially quenches NOx destruction. In test, modified chemiluminescent analyzer accurately measured NO and NOx concentrations for over 4 months with no denegation in performance.

**B78-10048**  
**MEASUREMENT OF TOTAL ORGANIC CONCENTRATION IN WATER**  
E. WINKLER  
Jun. 1978

**MSC-16497** Vol. 3, No. 1, p. 55  
Instrument for determining total organic concentration in water uses no corrosive reagents or gases. Instead continuous ultraviolet photolysis process converts organic compounds to carbon dioxide (CO2). CO2 electrode is used to measure CO2 content. Only reagent necessary is oxygen, generated in situ by electrolyzing some water. In addition to application in aerospace industry, system has potential uses in pollution monitoring and in laboratory analyses.

**B78-10049**  
**SOLAR PHOTOLYSIS OF WATER**  
P. R. RYASON  
Jun. 1978

**NPO-14126** Vol. 3, No. 1, p. 56  
Photolysis and regeneration reactions could be used in cycle process to generate hydrogen gas from water using sunlight.

**B78-10050**  
**LOW-COST HIGH PURITY PRODUCTION**  
V. K. KAPUR (Stanford Res. Inst.)  
Jun. 1978

**NPO-14198** Vol. 3, No. 1, p. 57  
Economical process produces high-purity silicon crystals suitable for use in solar cells. Reaction is strongly exothermic and can be initiated at relatively low temperature, making it potentially suitable for development into low-cost commercial process. Important advantages include exothermic character and comparatively low process temperatures. These could lead to significant savings in equipment and energy costs.

**B78-10051**  
**ULTRA-HIGH-STRENGTH BORON FIBERS**  
D. R. BEHRENDT, J. A. DICARLO, H. H. GRIMES, and R. J. SMITH

Jun. 1978 See also NASA TN-D-8219 (N76-22313); NASA TM-X-73402 (N76-21293); NASA TM-X-73627 (N77-23207)

**LEWIS-12739** Vol. 3, No. 1, p. 57  
Boron-on-tungsten fibers with tensile strength and strain-to-failure values increased by fifty percent over commercial grades are produced by controlled chemical-etching process. Improved fibers have potential applications as lightweight composites in ground vehicles, spacecraft, and rotors for energy storage.

**B78-10052**  
**PARTIAL INTERLAMINAR SEPARATION FOR COMPOSITES**  
W. ELBER  
Jun. 1978

**LANGLEY-12065** Vol. 3, No. 1, p. 58  
Epoxy-matrix composites with improved fracture toughnesses, tensile strengths, and impact resistances are fabricated by using perforated film to break part of bond between laminae. Separation diffuses local stress concentrations near cracks, inhibiting their ability to propagate. Tests on modified panels showed fifty percent increase in fracture strengths.

**B78-10053****FIRE-RETARDANT FOAMS**

J. GAGLIANI (Intern. Harvester Co.)

Jun. 1978 See also NASA CR-147496 (N76-18278)

**MSC-16222****Vol. 3, No. 1, p. 59**

Family of polyimide resins are being developed as foams with exceptional fire-retardant properties. Foams are potentially useful for seat cushions in aircraft and ground vehicles and for applications such as home furnishings and building-construction materials. Basic formulations can be modified with reinforcing fibers or fillers to produce cellular materials for variety of applications. By selecting reactants, polymer structure can be modified to give foams with properties ranging from high resiliency and flexibility to brittleness and rigidity.

**B78-10054****ABRASION-RESISTANT ANTIREFLECTIVE COATING FOR POLYCARBONATE**

T. J. WYDEVEN

Jun. 1978

**ARC-11047****Vol. 3, No. 1, p. 60**

Following plasma-polymerization technique, treatment in oxygen glow discharge further enhances abrasion resistance and transmission. Improvement in abrasion resistance was shown by measuring percentage of haze resulting from abrasion. Coating samples were analyzed for abrasion using standard fresh rubber eraser. Other tests included spectra measurements and elemental analysis with spectrometers and spectrophotometers.

**B78-10055****ELECTROPLATING AND STRIPPING COPPER ON MOLYBDENUM AND NIOBIUM**

J. L. POWER

Jun. 1978

**LEWIS-12151****Vol. 3, No. 1, p. 60**

Molybdenum and niobium are often electroplated and subsequently stripped of copper. Since general standard plating techniques produce poor quality coatings, general procedures have been optimized and specified to give good results.

**B78-10056****CUSTOM BLENDING OF LAMP PHOSPHORS**

R. E. KLEMM (Singer Co.)

Jun. 1978

**MSC-16692****Vol. 3, No. 1, p. 62**

Spectral output of fluorescent lamps can be precisely adjusted by using computer-assisted analysis for custom blending lamp phosphors. With technique, spectrum of main bank of lamps is measured and stored in computer memory along with emission characteristics of commonly available phosphors. Computer then calculates ratio of green and blue intensities for each phosphor according to manufacturer's specifications and plots them as coordinates on graph. Same ratios are calculated for measured spectrum. Once proper mix is determined, it is applied as coating to fluorescent tubing.

**B78-10057****CURE-RATE DATA FOR SILICONE ADHESIVE**

C. CLATTERBUCK and A. FISHER

Jun. 1978

**GSFC-12330****Vol. 3, No. 1, p. 62**

Report describes work with concentrations down to 0.07 percent and is useful when applying adhesives in terrestrial and space applications. Cured Silicone retains low-outgassing properties as well as its snap, elongation, and resilience. Tests for hardness of silicone material also showed good results. No gross hysteresis observable on recovery from stretching nor was there any decrease in hardness.

**B78-10058****FIRE-AND SMOKE-RETARDANT POLYESTERS AND ELASTOMERS**

S. Y. CHUNG, J. D. INGHAM, D. D. LAWSON, and M. MOSESAN

Jun. 1978

**NPO-14053****Vol. 3, No. 1, p. 63**

Test results indicate that most effective fire-and smoke-retardant fillers are inorganic hydrates and carbonates that release water and/or carbon dioxide. Most effective filler tested was hydrated sodium silicate. Effectiveness is due to high water content and formation of viscous molten glass when heated. Glass tends to inhibit polymer combustion and to promote formation of char residue.

**B78-10059****MOSSBAUER STUDIES OF BULK AND THIN-FILM FETE**

K. AGGARWAL, W. T. ESCUE, and R. G. MENDIRATTA

Jun. 1978 See also NASA TM-X-73380 (N77-23965)

**M-FS-23773****Vol. 3, No. 1, p. 63**

In study, dependence of Mossbauer parameters on film thickness and film substrate was measured and related to iron tellurium structure. Report also describes film deposition technique (flash deposition) and Mossbauer apparatus.

**B78-10060****FAST-DRYING COATING**

E. J. BARTOSZEK (Pennwalt Corp.)

Jun. 1978

**MSC-16056****Vol. 3, No. 1, p. 64**

Nontoxic coating has excellent optical properties and can be pigmented in many different colors. It bonds well, can be applied by conventional methods, weathers well, and is self-extinguishing. Coating composition comprises latex blends of fluorocarbons, acrylic resins, stabilizers, modifiers, variety of inorganic pigments, and other additives. Suitable latex primers have also been developed from acrylic latex base.

**B78-10216****HIGH-YIELD PROCESS FOR PREPARING CALCIUM SUPEROXIDE**

T. J. WYDEVEN

Oct. 1978

**ARC-11053****Vol. 3, No. 2, p. 223**

Pressure and temperature are controlled precisely and water is rapidly removed to inhibit back reaction in process.

**B78-10217****INTERACTIVE DATA-PROCESSING SYSTEM FOR METALLURGY**

T. J. RATHZ

Oct. 1978 See also NASA-TM-X-73379 (N77-23279)

**M-FS-23774****Vol. 3, No. 2, p. 224**

Equipment indicates that system can rapidly and accurately process metallurgical and materials-processing data for wide range of applications. Advantages include increase in contact between areas on image, ability to analyze images via operator-written programs, and space available for storing images.

**B78-10218****FIRE-RETARDANT EPOXY POLYMERS**

R. I. AKAWIE (Hughes Aircraft Co.), N. BILOW (Hughes Aircraft Co.), and T. W. GIANTS (Hughes Aircraft Co.)

Oct. 1978

**ARC-11182****Vol. 3, No. 2, p. 225**

Phosphorus atoms in molecular structure of epoxies make them fire-retardant without degrading their adhesive strength. Moreover, polymers are transparent, unlike compounds that contain arsenic or other inorganics. They have been used to bond polyvinylfluoride and polyether sulfone films onto polyimide glass laminates.

**B78-10219****COMPATIBILITY OF AU-CU-NI BRAZE ALLOY WITH NH<sub>3</sub>**

V. DIAZ, JR. (Rockwell Intern. Corp.)

Oct. 1978

**MSC-16864****Vol. 3, No. 2, p. 226**

Tests show that Gold-Copper-Nickel alloy is compatible with ammonia systems. Joining tubes by brazing has advantages such as reducing chances of excessive grain growth in base metal, saving weight, and cleanliness.

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**B78-10220**

### ANTISTATIC ADDITIVE FOR POLYIMIDE FILMS

M. N. SARBOLOUKI

Oct. 1978

**NPO-14232**

**Vol. 3, No. 2, p. 227**

Thin polyimide films are given excellent antistatic properties even at high temperature by low-level loading with lithium salts. Extremely hygroscopic, these salts absorb a layer of atmospheric water that provides conductive paths allowing charges to dissipate.

**B78-10221**

### BRAZED BORON-SILICON CARBIDE/ALUMINUM STRUCTURAL PANELS

W. E. ARNOLD, JR., T. T. BALES, T. G. BROOKS, A. G. LAWSON, P. D. MITCHELL, D. M. ROYSTER, and R. WIAIT (Vought Corp.)  
Oct. 1978 See also NASA TM-X-3432 (N77-18220)

**LANGLEY-12244**

**Vol. 3, No. 2, p. 228**

Fluxless brazing process minimizes degradation of mechanical properties composite material of silicon carbide coated boron fibers in an aluminum matrix. Process is being used to fabricate full-scale Boron-Silicon Carbide/Aluminum-Titanium honeycomb core panels for flight testing and ground testing.

**B78-10222**

### PULSE-ECHO PROBE OF ROCK PERMEABILITY NEAR OIL WELLS

K. Y. NARASIMHAN and S. P. PARTHASARATHY

Oct. 1978

**NPO-14192**

**Vol. 3, No. 2, p. 229**

Processing method involves sequential insonifications of borehole wall at number of different frequencies. Return signals are normalized in amplitude, and root-mean-square (rms) value of each signal is determined. Values can be processed to yield information on size and number density of microfractures at various depths in rock matrix by using averaging methods developed for pulse-echo technique.

**B78-10223**

### PRESSURE-SENSITIVE GLASS REACTION CELL

R. T. ANSELM (Martin Marietta Corp.)

Oct. 1978

**LANGLEY-11256**

**Vol. 3, No. 2, p. 230**

Special all glass reaction cell is used to determine catalytic effect of various materials on hydrazine decomposition.

**B78-10224**

### IMPROVED ALKALI-METAL/SILICATE BINDERS

J. SCHUTT

Oct. 1978

**GSFC-12303**

**Vol. 3, No. 2, p. 231**

Family of inorganic binders utilizes potassium or sodium oxide/silicate dispersion and employs high mole ratio of silicon dioxide to alkali-metal binder. Binders are stable, inexpensive, extremely water resistant, and easy to apply.

**B78-10225**

### IMPROVED EPOXY ADHESIVE WITH RADIOGRAPHIC TRACER

R. G. CAMPBELL (McDonnell Douglas Corp.)

Oct. 1978

**MSC-18020**

**Vol. 3, No. 2, p. 231**

Addition of tungsten powder (4 percent by weight) to commercially available low viscosity epoxy adhesive, yields nonmetal composite repair material with enhanced radiographic contrast for radiographic and ultrasonic inspection techniques.

**B78-10226**

### REPAIRING SILICON CARBIDE COATINGS

D. M. SHUFORD (Vought Corp.)

Oct. 1978

**MSC-18033**

**Vol. 3, No. 2, p. 232**

Simple technique uses commercial binder, containing commercially available blended powder mixture for repairing silicon carbide coatings.

**B78-10227**

### CORROSION DETECTION AND EVALUATION

C. C. KAMMERER (Rockwell Intern. Corp.), F. H. STUCKENBERG (Rockwell Intern. Corp.), and F. E. SUGG (Rockwell Intern. Corp.)  
Oct. 1978

**M-FS-24436**

**Vol. 3, No. 2, p. 232**

Report details comprehensive study of nondestructive methods for detecting and/or evaluating up to six different types of corrosion: general, galvanic filiform, pitting, intergranular, and stress. Studied methods include: visual/optical inspection, radiography, penetrant inspection, analysis by polarized light, electrical conductivity measurements, pH analysis, and ultrasonic inspection.

**B78-10228**

### RESPONSE OF GRAPHITE/EPOXY COMPOSITES TO MOISTURE

H. POWELL (Rockwell Intern. Corp.) and D. J. ZIGRANG (Rockwell Intern. Corp.)

Oct. 1978

**MSC-16899**

**Vol. 3, No. 2, p. 233**

Report presents comparative absorption and desorption data obtained from response of graphite epoxy composites to moisture experiments with Fiberite 934, Narmco 5208, and Hexcel F-263 epoxy resin systems in cross-piled collimated laminates containing Thornel-300 graphite fibers.

**B78-10229**

### MECHANICAL PROPERTIES OF 18-2 MN STAINLESS STEEL

J. W. MONTANO

Oct. 1978 See also NASA TM-X-73375 (N77-21214)

**M-FS-23843**

**Vol. 3, No. 2, p. 233**

Report details experimental data from behavioral studies of mechanical properties of 18-2 Mn (Nitronic 32) stainless steel obtained under cryogenic temperatures and stress-corrosion conditions.

**B78-10230**

### NITRONIC 60: A NEW ALLOY

J. W. MONTANO

Oct. 1978 See also NASA-TM-X-73359 (N77-16149); B78-10229; B78-10396

**M-FS-23844**

**Vol. 3, No. 2, p. 233**

Report presents test demonstrations of mechanical and stress-corrosion properties at very low temperatures. Included are design details of alloy specimens and test procedures.

**B78-10231**

### HYDROGEN EMBRITTLEMENT OF NICKEL

M. H. KAMDAR

Oct. 1978

**ARC-10966**

**Vol. 3, No. 2, p. 234**

Report describes comprehensive study of hydrogen embrittlement in high purity single-crystal and polycrystalline nickel at temperatures from -130 degrees C to 20 degrees C.

**B78-10342**

### COAL DESULFURIZATION WITH IRON PENTACARBONYL

G. C. HSU

Jan. 1979

**NPO-14272**

**Vol. 3, No. 3, p. 361**

Coal desulfurization with iron pentacarbonyl treatment under mild conditions removes up to eighty percent of organic sulfur. Preliminary tests on treatment process suggest it may be economical enough to encourage investigation of use for coal desulfurization. With mild operating conditions, process produces environmentally-acceptable clean coal at reasonable cost.

**B78-10343**

### COAL LIQUEFACTION TO INCREASE JET FUEL PRODUCTION

Innovator not given (Institute of Gas Technology) Jan. 1979 See also NASA-CR-145028 (N78-75465)

**LANGLEY-12038**

**Vol. 3, No. 3, p. 362**

Processing concept that increases supply of jet fuel has been developed as part of study on methods for converting coal to

hydrogen, methane, and jet fuel. Concept takes advantage of high aromatic content of coal-derived liquids to make high-octane gasoline, instead of destroying aromatics to make jet fuel.

**B78-10344****IMPROVED NUCLEONIC COAL-THICKNESS MONITOR**

C. E. CROUCH, S. D. ROSE, and E. W. JONES (Mississippi State Univ.)

Jan. 1979 See also NASA-CR-150465 (N78-11454)

**M-FS-23725**

Vol. 3, No. 3, p. 363

Design for coal-thickness-sensing instrument features independent hydropneumatic suspension of radiation source and detector. Monitor uses source and detector which are independently mounted, to follow contour of coal surface more closely and to eliminate errors caused by variations in airgap along radiation path. Device may help to bring fully-automated coal mining closer to reality.

**B78-10345****COAL MINING WITH A LIQUID SOLVENT**

D. D. LAWSON and C. G. MILLER

Jan. 1979

**NPO-14028**

Vol. 3, No. 3, p. 364

Study suggests carbonated water can dissolve or suspend coal and carry it to surface. Mixture of carbon dioxide and water may be coal solvent that will make unmanned mining reality. When used with proposed process monitoring coal solubility with conventional strain gage, solvent is basis for rapid cost effective extraction of coal from underground seams.

**B78-10346****LOW-TEMPERATURE ELASTOMER PRODUCTION AND CURING**

J. D. INGHAM and R. A. RHEIN

Jan. 1979

**NPO-13899**

Vol. 3, No. 3, p. 364

Thermally and chemically stable polymers are needed for materials applications, particularly highly-stable elastomers for solid propellant binders where initial high temperature required for dissolving anhydride in polymer is detrimental. Solvent reactant system allows polymerization without condensation of products under low heat. Solvents utilized were dimethylacetamide, dimethylformamide, etc.

**B78-10347****GAS-PATH SEAL MATERIAL**

R. L. JOHNSON, L. P. LUDWIG, and R. C. BILL (U. S. Army Res. & Tech. Labs.)

Jan. 1979 See also NASA-TP-1128 (N78-15229); NASA-TM-X-73650 (N77-23489)

**LEWIS-12623**

Vol. 3, No. 3, p. 365

Composite sealant reduces frictional heating, wear, and leakage. Sealant is needed to reduce wear of rotating compressor-blade tips if they rub against stationary engine casing. Nickel substrate with plasmasprayed aluminum top layer was evaluated. Results showed little wear on top layer took place; layer itself remained intact and provided heat conduction pathway from rub surface.

**B78-10348****PRECISION CLEAVER FOR 'SOFT' CRYSTALS**

J. S. J. BENEDICTO, F. HALLBERG, and B. E. WOODGATE

Jan. 1979

**GSFC-12291**

Vol. 3, No. 3, p. 366

'Soft' crystals are cleaved as thin 0.005 inch with special cleaver. Thin slices of soft crystalline materials are used in X-ray spectrometers. Slices are usually cut by hand with wire or blade. Wire tends to scratch surface and to produce slices of nonuniform thickness. Device will rapidly cut soft crystals in smooth, thin, uniform slices.

**B78-10349****EMBRITTLMENT PROOF NICKEL-ALLOY BELLWS**

C. M. DANIELS, JR. (Rockwell Intern. Corp.)

Jan. 1979

**M-FS-19331**

Vol. 3, No. 3, p. 367

Thin cover of corrosion-resistant steel (CRES) protects metal bellows and ducts against hydrogen embrittlement. Bellow current carries hydrogen at high pressure and currently is used in the engine of Space Shuttle.

**B78-10350****CORONA-DISCHARGE AIR-PURIFICATION SYSTEM**

T. J. WYDEVEN (Stanford Univ.) and D. L. FLAMM

Jan. 1979

**ARC-10975**

Vol. 3, No. 3, p. 368

Plasma reaction chamber removes trace contaminants from spacecraft, submarines, and other closed environments by oxidizing contaminants to produce carbon dioxide and water. Contaminants are alcohols, esters, hydrogen sulfide, and ammonia. Others are lubricant solvents such as Freons, aromatics, and Ketones. Contaminants are removed from chamber by scrubber.

**B78-10351****ZONE-REFINING ENCAPSULATED SEMICONDUCTORS**

M. C. DAVIDSON and L. R. HOLLAND

Jan. 1979

**M-FS-23902**

Vol. 3, No. 3, p. 369

Reflector directs intense, sharply focused heat precisely where it is needed for zone-refining semiconductor materials. Reflector is especially suited for compound semiconductors which must be sealed inside capsule to prevent vaporizing during zone refining. Device is flattened toroid with elliptical-cross-section, much like horizontal partly-inflated inner tube.

**B78-10352****PREDICTING STRUCTURES OF CROSS-LINKED CONDENSATION POLYMERS**

H. E. MARSH

Jan. 1979

**NPO-14007**

Vol. 3, No. 3, p. 370

Mathematical procedure is used to predict structure of cross-linked condensation polymer differentiated from an additional polymer resulting from specific reaction. Procedure will greatly reduce amount of empirical formulation and testing needed to produce desired product.

**B78-10353****ECONOMICAL SYNTHESIS OF POTASSIUM SUPEROXIDE**

A. T. BELL (California Univ., Berkeley) and P. SADHUKHAN (California Univ., Berkeley)

Jan. 1979

**ARC-10992**

Vol. 3, No. 3, p. 372

High-frequency discharge in oxygen can be used to prepare superoxides of alkali and alkaline-earth metals. Since no direct-current discharge at the electrodes is present, no sputtering can contaminate the product, hence a high conversion efficiency.

**B78-10354****FIRE-RETARDANT COVERING FOR SMALL CONTAINERS**

S. R. RICCIETELLO and P. M. SAWKO

Jan. 1979

**ARC-11104**

Vol. 3, No. 3, p. 372

Flexible intumescent sheets of exceptionally uniform thickness may be used to protect containers and other small objects less than 25.4 cm in diameter from fire hazards.

**B78-10355****FIRE-RETARDANT LIGHTWEIGHT COMPOSITE**

W. J. GILWRE, JR.

Jan. 1979

**ARC-10918**

Vol. 3, No. 3, p. 373

Low-density honeycomb-core composite minimizes fire-safety related hazards such as fire resistance and noxious gas generation.

**B78-10356****HEAT RESISTANT NONTXIC LAMINATE**

D. A. KOURTIDES and J. A. PARKER

Jan. 1979

**ARC-11040**

Vol. 3, No. 3, p. 374

Light-weight low-cost laminate used to replace epoxy compound panels is suitable for auto, railcar, and aircraft structural

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parts. Physical and thermal tests show panels made from formulation have better insulative properties, and burn cleaner with less toxic gas generation than panels made with conventional materials.

**B78-10357**

### ION-BEAM TEXTURING OF MATERIALS

W. R. HUDSON

Jan. 1979 See also NASA-TM-X-73470 (N76-30957)

**LEWIS-12996**

**Vol. 3, No. 3, p. 374**

Xenon ion-beam source is used to create microscopically-rough surface texture by sputter-etching surface while simultaneously sputter depositing lower yield material onto surface.

**B78-10358**

### CHEMICAL AGENT BOOSTS NATURAL-RUBBER OUTPUT

A. J. BAUMAN

Jan. 1979

**NPO-14185**

**Vol. 3, No. 3, p. 376**

Topical treatment of guayule plant with triethylamine compounds may boost rubber yield 400 to 500 percent.

**B78-10359**

### TOXIC SUBSTANCES HANDBOOK

T. L. JUNOD

Jan. 1979 See also NASA-TM-73866 (N78-20755)

**LEWIS-13124**

**Vol. 3, No. 3, p. 376**

Handbook, published in conjunction with Toxic Substances Alert Program at NASA Lewis Research Center, profiles 187 toxic chemicals in their relatively pure states and include 27 known or suspected carcinogens.

**B78-10360**

### EFFECTS OF MOISTURE ON GRAPHITE/EPOXY COMPOSITES

C. W. DILL (Rockwell Intern. Corp.)

Jan. 1979

**MSC-18045**

**Vol. 3, No. 3, p. 377**

Report describes tests made on commercially available graphite/epoxy composites to analyze effects of water absorption and temperature spiking on composite strength and stiffness.

**B78-10361**

### OXYGEN AND NITROGEN RAMAN SPECTRA

G. C. FRALICK

Jan. 1979

**LEWIS-12849**

**Vol. 3, No. 3, p. 377**

Engineering design computer program that calculates rotational Raman spectrum of either nitrogen or oxygen can be used to increase performance of gas-turbine engines by predicting extent of pressure broadening associated with temperature measurements at elevated pressure.

**B78-10504**

### ULTRAFINE PBI FIBERS AND YARNS

J. R. LEAL (Celanese Research Corp.) and M. TAN (Celanese Research Corp.)

Mar. 1979 See also NASA-CR-152057 (N78-16189)

**ARC-11221**

**Vol. 3, No. 4, p. 529**

Gentle precisely controlled process is used to draw polybenzimidazole (PBI) fibers to denier as low as 0.17 per fiber. Yarns of lightweight fibers could be useful in applications where lightweight textiles must withstand high temperatures, corrosion, or radiation.

**B78-10505**

### MEASUREMENT OF SUBCOAT THICKNESS BY CHARACTERISTIC X-RAYS

W. J. HARRIS (Lockheed Missiles and Space Co.) and R. A. QUINN (Lockheed Missiles and Space Co.)

Mar. 1979

**MSC-16718**

**Vol. 3, No. 4, p. 530**

Technique employs x-ray scanning system to measure thickness of topcoat and subcoat of heat shields and other ceramic materials. System scans sample in raster pattern and depicts image of structure on cathode-ray-tube for viewing or photocopying within seconds.

**B78-10506**

### ION-BEAM-TEXTURED GRAPHITE

A. N. CURREN, R. FORMAN, J. S. SOVEY, and W. R. HUDSON

Mar. 1979 See also NASA-TP-1097 (N78-11230)

**LEWIS-12724**

**Vol. 3, No. 4, p. 530**

Results of evaluation of seven different materials (copper, tantalum, titanium carbide, soot, smooth pyrolytic graphite, and ion-beam-textured graphite) for low secondary-electron emitting surface for depressed collectors in microwave amplifiers indicate that ion-beam-textured graphite shows greatest potential for use.

**B78-10507**

### ABSORPTIVE COATING FOR ALUMINUM SOLAR PANELS

D. DESMET (Univ. of Alabama), A. JASON (Univ. of Alabama), and A. PARR (Univ. of Alabama)

Mar. 1979

**M-FS-25033**

**Vol. 3, No. 4, p. 532**

Method for coating forming coating of copper oxide from copper component of sheet aluminum/copper alloy provides strong durable solar heat collector panels. Copper oxide coating has solar absorption characteristics similar to black chrome and is much simpler and less costly to produce.

**B78-10508**

### FIRE-RESISTANT WOOD COMPOSITES

P. M. SAWKO

Mar. 1979

**ARC-11174**

**Vol. 3, No. 4, p. 532**

Hot pressed wood panels made with modified novolak resins have burnthrough time of 450 s as compared to 280 s for products using conventional novolak resins. Incorporation of inorganic filler reduces flame spread index of panels from more than 200 to 60 or 70.

**B78-10509**

### ANTISTATIC COATING FOR ACRYLICS

V. HADEK, A. REMBAUM, and R. B. SOMONO

Mar. 1979

**NPO-13867**

**Vol. 3, No. 4, p. 534**

After immersion in low molecular-weight solvents such as acetonitril or nitromethane, clear acrylic plastics dissipate up to 70% of induced electric charge within one minute, yet retain optical clarity.

**B78-10510**

### COATED-FELT THERMAL INSULATION

R. L. DOTTS, B. J. MARAIA, J. A. SMITH, I. K. SPIKER, and G. STROUHAL

Mar. 1979

**MSC-12737**

**Vol. 3, No. 4, p. 535**

Thin coated-felt insulation tile is lighter and easier-to-install replacement for silica tiles for temperatures below 700 F.

**B78-10511**

### LOW-TEMPERATURE REFINING OF COAL

P. S. GANGULI and G. C. MSU

Mar. 1979

**NPO-14210**

**Vol. 3, No. 4, p. 535**

Laboratory-tested process demonstrates technical feasibility of new low temperature chemical pretreatment of new coal that yields purified product with low sulfur, oxygen, and inorganic ash content.

**B78-10512**

### ACCELERATED PURIFICATION OF COLLOIDAL SILICA SOLS

E. B. BAHNSEN (Lockheed Missiles and Space Co.), S. GAROFALINI (Lockheed Missiles and Space Co.), and A. PECHMAN (Lockheed Missiles and Space Co.)

Mar. 1979

**MSC-16793**

**Vol. 3, No. 4, p. 536**

Accelerated purification process for colloidal sols using heat/deionization scheme, sharply reduces waiting time between deionization cycles from several months to a few days. Process produces same high purity silica sols as conventional methods.



**B78-10513**

**FORMING 'DYNAMIC' MEMBRANES ON STAINLESS STEEL**  
C. A. BRANDON (Clemson University) and J. L. GADDIS (Clemson University)

Mar. 1979

**MSC-18172**

**Vol. 3, No. 4, p. 537**

'Dynamic' zirconium polyacrylic membrane is formed directly on stainless steel substrate without excessive corrosion of steel. Membrane is potentially useful in removal of contaminated chemicals from solution through reversed osmosis. Application includes use in filtration and desalination equipment, and in textile industry for separation of dyes from aqueous solvents.

**B78-10514**

**DEAERATING HIGH-VISCOSITY SILICON RUBBER**

R. W. GABRIEL (Rockwell Intern. Corp.)

Mar. 1979

**MSC-16694**

**Vol. 3, No. 4, p. 538**

Method utilizing a modified hand operated centrifuge is used to deaerate high viscosity (6,000 poise) silicon rubber for economical production of void-free silicon rubber seals.

**B78-10515**

**HIGH-PRESSURE LIQUID CHROMATOGRAPHY OF AROMATIC AMINES**

P. R. YOUNG

Mar. 1979

**LANGLEY-12163**

**Vol. 3, No. 4, p. 538**

Analysis made on commercially available liquid chromatograph demonstrates high-pressure liquid chromatographic conditions for separation of approximately 50 aromatic amines ranging from simple aniline derivatives to complex multiring di- and tri-amines.

**B78-10516**

**AUTOMATED ELECTROPHORESIS APPARATUS**

L. R. BAKER (Univ. of Arizona), P. H. BARTELS (Univ. of Arizona), C. BLENMAN, JR. (Univ. of Arizona), J. M. HOLCOMB (Univ. of Arizona), and C. CHAN (Univ. of Arizona)

Mar. 1979

**M-FS-23983**

**Vol. 3, No. 4, p. 540**

Computer-controlled electro-optical system tracks particles in essentially real-time, analyzes data, and presents video and hard copy results. System presents significant increase in sampling rate and improved analysis of particle motion.

**B78-10517**

**IMPROVED IMIDE POLYMERIZATION CATALYST**

C. A. ESTRELLA, S. R. RICCIETELLO, and P. M. SAWKO

Mar. 1979

**ARC-11107**

**Vol. 3, No. 4, p. 541**

Catalyzation of imide polymers with metallic salts of 2-ethyl hexanoic acid allows reaction in production of flame resistant foams to proceed in one step without formation of undesirable heat-sensitive byproducts.

**B78-10518**

**POROUS BEAD PACKINGS FOR GAS CHROMATOGRAPHY**

G. E. POLLOCK and F. H. WOELLER

Mar. 1979

**ARC-11222**

**Vol. 3, No. 4, p. 542**

Porous polyaromatic packing beads have low polarity, high efficiency, short retention time, and may be synthesized in size range of 50 to 150 micrometers (100 to 270 mesh). Mechanically strong beads may be produced using various materials depending on elements and compounds to be identified.

**B78-10519**

**SCRATCH RESISTANT PLASTIC LENSES**

R. M. KUBACKI (Bell and Howell Co.)

Mar. 1979

**ARC-11039**

**Vol. 3, No. 4, p. 543**

Three-step plasma deposition process coats plastic lenses with strongly adhering scratch-resistant polymer film.

**B78-10520**

**MODEL OF SILICON PRODUCTION IN A FLUIDIZED-BED**

**REACTOR**

G. C. HSU, K. KIM, R. LUTWACK, and A. K. PRATUR

Mar. 1979 See also NASA-CR-154120 (N77-28581)

**NPO-14404**

**Vol. 3, No. 4, p. 544**

Mathematical model of fluidized-bed process for making high-purity silicon suitable for use in solar cell production can help evaluate potential performance and economics of such processes.

**05 LIFE SCIENCES****B78-10061**

**LOW-INTENSITY X-RAY AND GAMMA-RAY IMAGING DEVICE**

L. I. YIN

Jun. 1978

**GSFC-12263**

**Vol. 3, No. 1, p. 67**

Low-dosage, low-power X-ray system can be made completely self-contained, allowing fluoroscopy and radiography to be carried out in field and remote locations. New device, known as 'lixiscope,' can be used with conventional X-ray machine turned down to low level, or, it can be operated with radioisotope source for hand-held portable applications. Originally developed for X-ray astronomy, lixiscope obtains high sensitivity by using intermediate stages of photoelectron conversion and electron amplification to generate image suitable for direct viewing or for recording on film.

**B78-10062**

**DIP-MOLDED T-SHAPED CANNULA**

H. F. BROYLES, E. F. CUDDIHY, and J. MOACANIN

Jun. 1978

**NPO-14073**

**Vol. 3, No. 1, p. 68**

Cannula, fabricated out of polyetherurethane, has been designed for long-term service. Improved cannula is T-shaped to collect blood from both directions, thus replacing two conventional cannulas that are usually required and eliminating need for large surgical wound. It is fabricated by using dip-molding process that can be adapted to other elastomeric objects having complex shapes. Dimensions of cannula were chosen to optimize its blood-flow properties and to reduce danger of excessive clotting, making it suitable for continuous service up to 21 days in vein or artery of patient.

**B78-10063**

**IMPROVED CONTROL OF MEDICAL X-RAY FILM EXPOSURE**

C. M. BERDAHL

Jun. 1978

**NPO-13808**

**Vol. 3, No. 1, p. 69**

Exposure sensing system for light-intensified motion-picture X-ray system uses aperture or adjustable diaphragm to sample light from image region of interest. Approach, along with approximate optics, can optimize exposure sensitivity.

**B78-10064**

**SELF-STERILIZING CANISTER**

L. C. YANG

Jun. 1978

**NPO-14237**

**Vol. 3, No. 1, p. 70**

Canister, originally conceived for remote sterilization of spacecraft packages, could be used terrestrially to handle samples in biologically hazardous environments. Multiwalled canister includes inner layer of pyrotechnic powder. For sterilization, electrically activated squib ignites powder, raising temperature of outer surface of canister to 230 degrees centigrade for several minutes. Thermal-buffer inner layer prevents inside temperature for exceeding 100 degrees centigrade to protect contents from damage. Samples in field hospitals and other emergency situations could also be handled by equipment.

**B78-10065****CONTROLLED FREEZING OF BIOLOGICAL SAMPLES**

T. A. CYGNAROWICZ and T. E. WILLIAMS

Jun. 1978

**GSFC-12173****Vol. 3, No. 1, p. 71**

Apparatus consists of thermocouple connected to semiconductor reference junction. Junction is connected to amplifier that boosts signal by 1,000. High-level signal is displayed on recorder and fed into second amplifier where it is compared with signal from potentiometer of programmed dc reference in bag-temperature programmer. Difference in signals indicates output voltage. Remaining circuitry provides zero-phase, time-proportion control of heaters such that heater power is directly proportional to error signal.

**B78-10066****BODY/BONE-MARROW DIFFERENTIAL-TEMPERATURE SENSOR**

V. J. ANSELMO and C. M. BERDAHL

Jun. 1978

**NPO-14121****Vol. 3, No. 1, p. 72**

Differential-temperature sensor developed to compare bone-marrow and body temperature in leukemia patients uses single stable amplifier to monitor temperature difference recorded by thermocouples. Errors are reduced by referencing temperatures to each other, not to separate calibration points.

**B78-10067****BACILLUS CEREUS STRAIN MCN AS A DEBRIDING AGENT**

H. P. DALTON (Medical Coll. of Virginia), B. W. HAYNES (Medical Coll. of Virginia), and L. L. STONE (Medical Coll. of Virginia)

Jun. 1978

**LANGLEY-12287****Vol. 3, No. 1, p. 73**

Biologically active means are effective for rapidly removing scar tissue caused by burns or corrosive agents. Specially selected strain of bacteria applied to injury site releases enzymes which are active against eschar. These bacteria tend to locate between eschar and unburned tissue, thus providing optimal cell surface area arrangement for enzyme dispersal. Procedure may prove especially useful in treatment of disaster casualties under relatively primitive conditions.

**B78-10068****FLUORESCENT MICROSPHERES**

A. REMBAUM

Jun. 1978

**NPO-13946****Vol. 3, No. 1, p. 74**

Latex particles with attached antibodies have potential biochemical and environmental applications. Human red blood cells and lymphocytes have been labeled with fluorescent microspheres by either direct or indirect immunological technique. Immunolabeled spheres can also be used for detecting and localizing specific cell surface receptors. Hormones and toxins may also be bondable.

**B78-10232****RAPID MEASUREMENT OF BACTERIA IN WATER**

E. CHAPPELLE, J. DEMING, G. L. PICCIOLO, E. L. JEFFERS (Boeing Co.), and R. R. THOMAS (Boeing Co.)

Oct. 1978

**GSFC-12158****Vol. 3, No. 2, p. 237**

Automated analysis system detects bacteria in saltwater, freshwater, sewage effluent, and other aqueous media. System may be adapted for computer control.

**B78-10233****MONITORING SYSTEMS FOR COMMUNITY WATER SUPPLIES**

R. E. TAYLOR (Boeing Co.), R. R. BROOKS (Boeing Co.), E. L. JEFFERS (Boeing Co.), A. T. LINTON (Boeing Co.), and G. D. POEL (Boeing Co.)

Oct. 1978 See also NASA-TM-X-58179 (N77-13909); B78-10234; B78-10236; B78-10237; B78-10267

**MSC-16778****Vol. 3, No. 2, p. 238**

Water monitoring system includes equipment and techniques for waste water sampling sensors for determining levels of

microorganisms, oxygen, chlorine, and many other important parameters. System includes data acquisition and display system that allows computation of water quality information for real time display.

**B78-10234****DATA PROCESSING FOR WATER MONITORING SYSTEM**

L. MONFORD and A. T. LINTON (Boeing Co.)

Oct. 1978 See also NASA-TM-X-58179 (N77-13909); B78-10233

**MSC-16842****Vol. 3, No. 2, p. 240**

Water monitoring data acquisition system is structured about central computer that controls sampling and sensor operation, and analyzes and displays data in real time. Unit is essentially separated into two systems: computer system, and hard wire backup system which may function separately or with computer.

**B78-10235****WATER SAMPLE COLLECTION AND DISTRIBUTION SYSTEM**

R. R. BROOKS (Boeing Co.)

Oct. 1978

**MSC-16841****Vol. 3, No. 2, p. 241**

Collection and distribution system samples water from six designated stations, filtered if desired, and delivers it to various analytical sensors. System may be controlled by Water Monitoring Data Acquisition System or operated manually.

**B78-10236****AUTOMATED ELECTROCHEMICAL SELECTION OF COLIFORMS**

R. E. TAYLOR, W. P. DILL (Boeing Co.), and E. L. JEFFERS (Boeing Co.)

Oct. 1978 See also B78-10233

**MSC-16777****Vol. 3, No. 2, p. 243**

Computer-controlled sensor system monitors and quantifies coliform organisms in waste water samples through molecular hydrogen detection techniques. System includes cleanup procedures, external sterilization of each sensor interface with working fluid as well as incubation cell interiors. Sensor system may also be operated manually.

**B78-10237****CHEMILUMINESCENCE AND BIOLUMINESCENCE MICROBE DETECTION**

R. E. TAYLOR, E. CHAPPELLE (GSFC), G. L. PICCIOLO (U.S. Food and Drug Admin.), E. L. JEFFERS (Boeing Co.), and R. R. THOMAS (Boeing Co.)

Oct. 1978 See also B78-10233

**MSC-16779****Vol. 3, No. 2, p. 244**

Automated biosensors for online use with NASA Water Monitoring System employs bioluminescence and chemiluminescence techniques to rapidly measure microbe contamination of water samples. System eliminates standard laboratory procedures requiring time duration of 24 hours or longer.

**B78-10238****CHEMICAL MEASUREMENT OF URINE VOLUME**

R. L. SAUER

Oct. 1978

**MSC-16585****Vol. 3, No. 2, p. 245**

Chemical method of measuring volume of urine samples using lithium chloride dilution technique, does not interfere with analysis, is faster, and more accurate than standard volumetric of specific gravity/weight techniques. Adaptation of procedure to urinalysis could prove generally practical for hospital mineral balance and catechoamine determinations.

**B78-10239****ARTIFICIAL LEG WITH NATURAL GAIT**

J. L. BURCH

Oct. 1978

**M-FS-23225****Vol. 3, No. 2, p. 246**

Prosthetic device employs actuator that stores energy from movement of natural leg and uses it to pivot artificial hip joint

in ensuing step reducing gait distortion and increasing stride cadence.

#### **B78-10240**

#### **BOOSTING PRODUCTION YIELD OF BIOMEDICAL PEPTIDES**

S. L. MANATT

Oct. 1978

**NPO-14142**

**Vol. 3, No. 2, p. 247**

Nuclear magnetic resonance (NMR) technique is employed to monitor synthesis of biomedical peptides. Application of NMR technique may improve production yields of insulin, ACTH, and growth hormones, as well as other synthesized biomedical peptides.

#### **B78-10241**

#### **POSITIVELY CHARGED MEMBRANE FOR UREA DIALYSIS**

W. A. MUELLER

Oct. 1978

**NPO-14101**

**Vol. 3, No. 2, p. 248**

Positively charged, porous membrane dividing two chamber dialysis machine allows urease decomposition within system while preventing return flow of ammonium ions to patient.

#### **B78-10242**

#### **A PROBE FOR BLOOD-VESSEL AND SPINAL INTERIORS**

R. E. FRAZER

Oct. 1978

**NPO-14132**

**Vol. 3, No. 2, p. 248**

Probe design allows insertion into lumen of blood vessels to perform oximetry and investigate plaque on interior vessel walls. Probe is more accurate than standard oximetry procedures of determining oxygenation of circulating blood.

#### **B78-10243**

#### **STACKED SOLAR CELLS MEASURE X-RAY EXPOSURE**

C. M. BERDAHL

Oct. 1978

**NPO-13954**

**Vol. 3, No. 2, p. 250**

Stacked arrangement of solar cells and scintillating sheets in alternating layers produces very sensitive X-ray measuring device. Sensor is compatible with short exposure times typical of modern X-ray film, making it suitable for application in medical soft X-ray facilities.

#### **B78-10244**

#### **IN VIVO BLOOD-FLOW MAPPING**

R. E. FRAZER

Oct. 1978

**NPO-14133**

**Vol. 3, No. 2, p. 251**

Application of laser doppler techniques to commercially available, low loss fiber optics allows direct reading of blood velocity within tiny blood vessels.

#### **B78-10245**

#### **BIOLOGICAL SAMPLING AND CLEANING DEVICE**

H. W. SCHEIDER

Oct. 1978

**NPO-14010**

**Vol. 3, No. 2, p. 252**

Flowing-liquid cleaner may be used to gently dislodge and remove 98 percent of biological particulates from surfaces. Cleaner may retain up to 90 percent of removed particulates for later analysis. If retention is not required, unit may be adapted to clean only. Cleaner is applicable wherever very clean surface is desired.

#### **B78-10246**

#### **AUTOMATIC PRIMATE FEEDER**

A. R. GANDY (Northrop Corp.)

Oct. 1978

**LANGLEY-11586**

**Vol. 3, No. 2, p. 253**

Zippered tubing and rotating wheel dispense food pellets reliably without contamination.

#### **B78-10247**

#### **IMPROVEMENTS IN MICROELECTROPHORESIS AP-**

#### **PARATUS**

B. W. GRUNBAUM (Univ. of Calif., Berkeley)

Oct. 1978

**ARC-11121**

**Vol. 3, No. 2, p. 253**

Improvements to conventional microelectrophoresis techniques can simplify and standardize clinical diagnosis of large electrically charged molecules. Improvements include special trays, tray and cell covers, membranes, and temperature controls.

#### **B78-10362**

#### **REMOTELY-POWERED INTRACRANIAL PRESSURE MONITOR**

T. B. FRYER

Jan. 1979

**ARC-11120**

**Vol. 3, No. 3, p. 382**

Implantable RF powered monitor uses capacitive transducer and stiff metal diaphragm that gives high stability for long term intracranial pressure monitoring. Design of monitor reduces risk of infection while improving patient comfort and mobility.

#### **B78-10363**

#### **BIOMEDICAL APPLICATIONS OF ION-BEAM TECHNOLOGY**

B. A. BANKS, A. J. WEIGAND, D. F. GIBBONS (Case Western Reserve Univ.), C. L. VANKAMPEN (St. Luke's Hospital), and C. A. BABBUSH

Jan. 1979 See also NASA-TM-X-73512 (N77-11655); NASA-TM-X-73468 (N76-30797); NASA-CR-135311 (N78-18672)

**LEWIS-12807**

**Vol. 3, No. 3, p. 382**

Microscopically-rough surface texture of various biocompatible alloys and polymers produced by ion-beam sputtering may result in improvements in response of hard or soft tissue to various surgical implants.

#### **B78-10364**

#### **AUTOMATED CHROMOSOME ANALYSIS**

K. R. CASTLEMAN, H. J. FRIEDEN, E. T. JOHNSON, P. A. RENNIE, and R. J. WALL

Jan. 1979

**NPO-13913**

**Vol. 3, No. 3, p. 383**

Minicomputer-controlled system automatically prepares and analyses blood samples and displays karyotype in pictorial form as primary output. System accuracy is assured by operator interaction at key points during process. System can process up to 576 specimens per day.

#### **B78-10365**

#### **AUTOMATED CONTROLLER FOR LIQUID-COOLED GARMENTS**

L. H. KUZNETZ

Jan. 1979 See also NASA-TM-58205 (N78-11704)

**MSC-18055**

**Vol. 3, No. 3, p. 385**

Automated controller is governed by inlet temperature of coolant and temperature differential across garment. Controller eliminates restrictive body attachments of physical sensors, while regulating temperature more efficiently than manual adjustment.

#### **B78-10366**

#### **ANTIHISTAMINES REDUCE ULCERATION PRODUCED BY INDOMETHACIN**

J. VERNIKOS-DANELIS and P. A. BROWN (San Jose State Univ.)

Jan. 1979

**ARC-11118**

**Vol. 3, No. 3, p. 386**

Studies indicate that therapeutic application of antihistamines such as, metiamide, promethazine, or pyrilamide, may reduce occurrence of gastric ulceration produced by indomethacin.

#### **B78-10367**

#### **SWEAT COLLECTION CAPSULE**

R. W. DELAPLAINE and J. E. GREENLEAF

Jan. 1979

**ARC-11031**

**Vol. 3, No. 3, p. 387**

Capsule, with filter paper insert, is used to collect sweat for rate monitoring, chromatographic analysis, or active sweat gland

location within specified area. Construction of capsule allows change of inserts while device remains strapped in place.

**B78-10368**

**BIOCOMPATIBILITY OF SURGICAL IMPLANTS**

D. H. KAELBLE (Rockwell Intern. Corp.)

Jan. 1979

**NPO-14291**

**Vol. 3, No. 3, p. 387**

Method of selecting biocompatible materials for surgical implants uses fracture mechanic relationships and surface energies of candidate materials in presence of blood plasma. Technique has been used to characterize 190 materials by parameters that reflect their biocompatibility.

**B78-10369**

**MICROPROCESSOR-BASED CARDIOPULMONARY MONITOR**

J. A. RUMMEL, C. F. SAWIN, M. C. BUDERER (Technology Inc.), D. G. MAULDIN (Technology Inc.), and K. M. TAMER (Technology Inc.)

Jan. 1979 See also NASA-CR-151688 (N78-21752)

**MSC-18235**

**Vol. 3, No. 3, p. 388**

Incorporation of microprocessors in design of complete cardiopulmonary monitoring system alloys size reduction and cuts power requirements by ninety percent.

**B78-10370**

**RESTERILIZABLE ELECTRODE FOR ELECTROSURGERY**

E. R. ENGSTROM (Univ. of Wisconsin-Madison) and J. C. HOUGE (Univ. of Wisconsin-Madison)

Jan. 1979

**HQN-10915**

**Vol. 3, No. 3, p. 389**

Required properties of flexibility, electrical conductivity, tensile strength, and tear resistance of electrosurgical electrodes is retained through utilization of flexible-polymer/conductive particle composites for electrodes.

**B78-10371**

**RETAINER FOR LABORATORY ANIMALS**

R. W. LEE

Jan. 1979

**LANGLEY-12353**

**Vol. 3, No. 3, p. 390**

Bio-retainer holds laboratory animals in fixed position for research and clinical experiments. Retainer allows full access to animals and can be rapidly opened and closed to admit and release specimens.

**B78-10372**

**IMPROVED MYOCARDIUM TRANSDUCER**

V. H. CULLER, C. FELDSTEIN, and G. W. LEWIS

Jan. 1979

**NPO-14107**

**Vol. 3, No. 3, p. 391**

Method of implanting myocardium transducer uses special indented pins that are caught and securely held by epicardial fibers. Pins are small enough to cause minimum of trauma to myocardium during implantation or removal.

**B78-10373**

**IMPLANTABLE DIGITAL HEARING AID**

A. M. KISSIAH, JR.

Jan. 1979

**KSC-11009**

**Vol. 3, No. 3, p. 391**

Hearing aid converts analog output of microphone into digital pulses in about 10 channels of audio frequencies. Each pulse band could be directly connected to portion of auditory nerve most sensitive to that range.

**B78-10374**

**AUTOMATED SYRINGE SAMPLER**

G. C. PURGOLD

Jan. 1979

**LANGLEY-12308**

**Vol. 3, No. 3, p. 393**

Device is designed primarily for remotely collecting field samples of water or air from polluted sources or from tracer gases used to track such sources over long distances.

**B78-10375**

**WIDEBAND EMG TELEMETRY SYSTEM**

S. A. ROSATINO and R. M. WESTBROOK

Jan. 1979

**ARC-11209**

**Vol. 3, No. 3, p. 394**

Miniature, individual crystal-controlled RF transmitters located in EMG pressure sensors simplifies multichannel EMG telemetry for electronic gait monitoring. Transmitters which are assigned operating frequencies within 174 216 MHz band have linear frequency response from 20 - 2000 Hz and operate over range of 15 m.

**B78-10376**

**MEDICAL INFORMATION MANAGEMENT SYSTEM**

S. ALTERESCU, K. R. HIPKINS, and C. A. FRIEDMAN (Federal City College)

Jan. 1979

**GSFC-12078**

**Vol. 3, No. 3, p. 396**

On-line interactive information processing system easily and rapidly handles all aspects of data management related to patient care. General purpose system is flexible enough to be applied to other data management situations found in areas such as occupational safety data, judicial information, or personnel records.

**B78-10521**

**SEPARATING BIOLOGICAL CELLS**

D. E. BROOKS (Univ. of Oregon)

Mar. 1979

**M-FS-23883**

**Vol. 3, No. 4, p. 547**

Technique utilizing electric field to promote biological cell separation from suspending medium in zero gravity increases speed, reduces sedimentation, and improves efficiency of separation in normal gravity.

**B78-10522**

**FLOW-COMPENSATING PRESSURE REGULATOR**

E. F. BAEHR

Mar. 1979 See also B78-10523

**LEWIS-12718**

**Vol. 3, No. 4, p. 548**

Pressure regulator developed for use with cataract-surgery instrument controls intraocular pressure during substantial variations in flow rate of infusion fluid. Device may be applicable to variety of eye-surgery instruments.

**B78-10523**

**INTRAOCULAR PRESSURE REDUCTION AND REGULATION**

E. F. BAEHR and W. J. MCGANNON

Mar. 1979 See also B78-10522

**LEWIS-12723**

**Vol. 3, No. 4, p. 549**

System designed to reduce intraocular pressure hydraulically to any level desired by physician over set time and in controlled manner has number of uses in ophthalmology. Device may be most immediately useful in treatment of glaucoma.

**B78-10524**

**HAND-HELD VITAL-SIGNALS MONITOR**

G. A. RINARD (Denver Res. Inst.), D. A. STEFFEN (Denver Res. Inst.), and R. E. STURM (Denver Res. Inst.)

Mar. 1979

**MSC-18232**

**Vol. 3, No. 4, p. 551**

Complete miniaturized physiological vital-signs monitor displays body temperature, heart rate, and breath rate, and has provision to display blood-pressure data fed from external circuitry.

**B78-10525**

**HYBRID TEMPERATURE-MONITORING CIRCUIT**

G. A. RINARD (Denver Res. Inst.), D. A. STEFFEN (Denver Res. Inst.), and R. E. STURM (Denver Res. Inst.)

Mar. 1979 See also B78-10524

**MSC-18231**

**Vol. 3, No. 4, p. 553**

Hybrid circuit developed for use in hand-held vital signs monitor converts resistance of thermistor probe to 3 1/2 digit BCD (binary-coded-decimal) temperature readout. If used alone

circuit can form 'stand alone' temperature monitor or can transmit temperature data via telemetry to data acquisition systems.

**B78-10526****HYBRID ECG SIGNAL CONDITIONER**

G. A. RINARD (Denver Res. Inst.), D. A. STEFFEN (Denver Res. Inst.), and R. E. STURM (Denver Res. Inst.)  
Mar. 1979 See also B78-10524; B78-10528

**MSC-18230** Vol. 3, No. 4, p. 554

Circuit with high common-mode rejection has ability to filter and amplify accepted analog electrocardiogram (ECG) signals of varying amplitude, shape, and polarity. In addition, low power circuit develops standardized pulses that can be counted and averaged by heart/breath rate processor.

**B78-10527****HYBRID RESPIRATION-SIGNAL CONDITIONER**

G. A. RINARD (Denver Res. Inst.), D. A. STEFFEN (Denver Res. Inst.), and R. E. STURM (Denver Res. Inst.)  
Mar. 1979 See also B78-10524; B78-10528

**MSC-18226** Vol. 3, No. 4, p. 556

Hybrid impedance-pneumograph and respiration-rate signal conditioner element of hand-held vital signs monitor measures changes in impedance of chest during breathing cycle and generates analog respiration signal as output along with synchronous square wave that can be monitored by breath-rate processor.

**B78-10528****HYBRID HEART/BREATH-RATE PROCESSOR**

G. A. RINARD (Denver Res. Inst.), D. A. STEFFEN (Denver Res. Inst.), and R. E. STURM (Denver Res. Inst.)  
Mar. 1979 See also B78-10524; B78-10526; B78-10527

**MSC-18227** Vol. 3, No. 4, p. 557

Single hybrid circuit converts time between pulses from ECG signal conditioner of breath-rate signal conditioner to determine heart-rate of respiration-rate output of hand-held vital signs monitor.

**B78-10529****HYBRID LCD DRIVER**

G. A. RINARD (Denver Res. Inst.), D. A. STEFFEN (Denver Res. Inst.), and R. E. STURM (Denver Res. Inst.)  
Mar. 1979 See also B78-10524

**MSC-18229** Vol. 3, No. 4, p. 559

Display driver for hand-held signs monitor can be configured to operate either 4 digit or, by paralleling four drivers, to operate 16 digit liquid crystal display (LCD).

**B78-10530****HYBRID CLOCK GENERATOR**

G. A. RINARD (Denver Res. Inst.), D. A. STEFFEN (Denver Res. Inst.), and R. E. STURM (Denver Res. Inst.)  
Mar. 1979 See also B78-10524

**MSC-18228** Vol. 3, No. 4, p. 560

Clock driver hybrid for hand-held vital signs monitor generates all frequencies required for operation of vital signs system in compact low power configuration.

**B78-10531****IMPROVED PROBE FOR RECTAL-CANCER DETECTION**

R. E. FRAZER

Mar. 1979

**NPO-14247** Vol. 3, No. 4, p. 562

Modified protosigmoidoscope, with third partially mirrored lens, provides lateral as well as forward vision for thorough examination of patients for malignant or premalignant lesions of colon and rectum.

**B78-10532****SELF-PROPELLING, SELF-LOCATING COLONOSCOPE**

R. E. FAZER

Mar. 1979

**NPO-14092** Vol. 3, No. 4, p. 563

Articulated instrument moves by air actuated bladder, while defining position by ultrasonic or RF signals. Device allows optical

inspection of large bowel from cecum to rectum with minimal discomfort or risk to patient.

**B78-10533****NONCONTACTING ELECTROKINETOGRAPHY SYSTEM**

J. G. DAVIS (Lovelace-Bataan Medical Center) and D. M. HICKMAN (Lovelace-Bataan Medical Center)  
Mar. 1979

**MSC-18162**

Vol. 3, No. 4, p. 564

Noncontact acoustic technique utilizing air-coupled ultrasonic transducers for measuring motion of chest wall during cardiac cycle gives information on changes in size and compliance of heart ventricles. Information is digitized and fed to microprocessor for rapid storage and analysis for aid in diagnosis of heart condition.

## 06 MECHANICS

**B78-10069****AERODYNAMIC DESIGN LOWERS TRUCK FUEL CONSUMPTION**

L. STEERS

Jun. 1978

**FRC-11015**

Vol. 3, No. 1, p. 77

Energy-saving concepts in truck design are emerging from developing new shapes with improved aerodynamic flow properties that can reduce air-drag coefficient of conventional tractor-trailers without requiring severe design changes or compromising load-carrying capability. Improvements are expected to decrease somewhat with increased wind velocities and would be affected by factors such as terrain, driving techniques, and mechanical condition.

**B78-10070****COMBINATION FORCE AND ANGULAR-DEFLECTION INDICATOR**

J. F. KAUPPI (Rockwell Intern. Corp.)

Jun. 1978

**MSC-16155**

Vol. 3, No. 1, p. 78

Verification of pedal operation is possible with tool that measures force and angular displacement. With tool, one can check both rudder- and break-pedal operation.

**B78-10071****NONCONTACT MEASUREMENT OF ANGULAR DEFLECTION**

E. L. BRYANT

Jun. 1978

**LANGLEY-12178**

Vol. 3, No. 1, p. 79

Technique for measuring instantaneous angular deflection of object requires no physical contact. Technique utilizes two flat refractors, converging lens, and different photocell. Distinction of method is its combination of optical and electromechanical components into feedback system in which measurement error is made to approach zero. Application is foreseen in measurement of torsional strain.

**B78-10072****LOW-COST ULTRASONIC LAMB-WAVE TRANSDUCER**

C. KAMMERER (Rockwell Intern. Corp.)

Jun. 1978

**MSC-16333**

Vol. 3, No. 1, p. 80

Transducer propagates Lamb wave through thin aluminum sheet material. Model includes two elements that measure effects of damping and loading which, in turn, are indirectly equated to bond integrity. Transducer has been used to evaluate bond integrity of aluminum facing adhesively bonded to aluminum facing. Because of versatility, it is now possible to inspect many objects of different configurations that could not be reached with earlier transducers.

B78-10073

**QUICK-AND-EASY SHEAR-LOAD TESTING**

J. A. GUSTAFSON (Rockwell Intern. Corp.) and J. K. NEARY (Rockwell Intern. Corp.)

Jun. 1978

MSC-16765

Vol. 3, No. 1, p. 80

Device for applying shear loads to test specimens can be attached and removed without damaging specimen surface. Because it is quick, clean, and inexpensive, method is expected to be useful in commercial testing laboratories for applying shear loads to smooth surfaces on which there is no provision for conventional attachments and which could be easily damaged.

B78-10074

**IMPROVED STRAIN-GAGE CALIBRATION**

R. W. TROKE (Rockwell Intern. Corp.)

Jun. 1978

MSC-16852

Vol. 3, No. 1, p. 81

Accuracy of quarter-bridge strain gage is improved by accounting for nonlinearity of bridges output for equivalent compression and tension strains. Method provides relationships that connect measured strain and shunt calibration.

B78-10075

**SURFACE EXAMINATION OF SMALL PARTICLES**

B. C. BUZEK and T. K. GLASGOW

Jun. 1978 See also NASA TM-X-71749 (N75-30262)

LEWIS-12842

Vol. 3, No. 1, p. 82

Electron-microscopy specimen-preparation technique is used to study micron size particles. Process involves coating particles with vacuum-evaporated carbon, dissolving particles in solvent, then examining residue. Process is applicable to study of catalysts, nucleation and growth of metal oxides, and to determine chemical nature of lubricated surfaces after wear has occurred.

B78-10076

**THERMOCOUPLES MEASURE VERY-HOT GAS TEMPERATURES**

G. E. GLAWE, L. N. KRAUSE, and H. A. WILL

Jun. 1978 See also NASA TM-X-71883 (N76-18408)

LEWIS-12843

Vol. 3, No. 1, p. 83

Thermocouple probe incorporates small jet of inert gas to cool thermocouple. To measure gas temperatures, cooling jet is turned off momentarily, allowing thermocouple to heat up to near its melting point, then cooling is reapplied. Heating curve is recorded by high speed digital system. Computing system extrapolates final temperature thermocouple would have attained.

B78-10077

**INFRARED SCANNERS FOR TEMPERATURE MEASUREMENT IN WIND TUNNELS**

A. G. KANTSIOS

Jun. 1978

LANGLEY-12171

Vol. 3, No. 1, p. 84

Remote infrared scanners allow large surfaces to be studied without disturbing model and without extensive sensor installation. Computer techniques analyze data with accuracy of + or - 5 percent. Scanners are applicable to tracking and diffusion studies of rocket exhausts, nondestructive testing of rocket motor nozzles and composite materials, and detection of nonuniformity in home insulation.

B78-10078

**NOISE CALCULATION ON THE BASIS OF VORTEX FLOW MODELS**

J. C. HARDIN

Jun. 1978

LANGLEY-12271

Vol. 3, No. 1, p. 85

Flow-modeling technique yields relatively simple method for calculating sound radiation involving planar, cylindrical, or spherical surfaces. Model employs potential flow theory with action of viscosity on flowfield described in terms of point vortices. Surface presence in flow is analyzed, using classical image method; sound is calculated through sound generation theory reformulation.

B78-10079

**THERMAL-CONTROL CANISTER**

S. OLLENDORF

Jun. 1978

GSFC-12253

Vol. 3, No. 1, p. 87

Use of variable-conductance heat-pipe link together with fixed-conductance system allows canister temperature to vary over wide range, yet hold stable to + or - 1 degree Centigrade. System has fewer parts and requires considerably less power than conventional heaters and thermostats.

B78-10080

**CRYOSTAT SAFETY TENT**

J. L. MILLMAN

Jun. 1978

GSFC-12206

Vol. 3, No. 1, p. 88

Transparent vinyl tent is designed for easy assembly with minimum use of handtools. Tent prevents toxic or explosive vapors from entering building. Frame posts are mounted on casters to allow easy mobility.

B78-10081

**FILM ADHESIVE ENHANCES NEUTRON RADIOGRAPHIC IMAGES**

M. W. REED (Vought Missiles and Space Co.)

Jun. 1978

MSC-18061

Vol. 3, No. 1, p. 88

Resolution of neutron radiographic images of thermally conductive film is increased by replacing approximately 5 percent of aluminum powder, which provides thermal conductivity, with gadolinium oxide. Oxide is also chemically stable.

B78-10082

**THERMAL COMPENSATOR FOR HELIUM REFRIGERATORS**

J. J. HILLMAN and D. E. JENNINGS

Jun. 1978

GSFC-12168

Vol. 3, No. 1, p. 89

Closed-cycle helium refrigerator sensor generates negative-feedback control signals that drive heating diode to maintain temperature stability. Temperature-sensing diode and heating diode are mounted on heat sink that provides conductive path between load and cold tip. Method is applicable to other temperature-control applications, such as laser equipment, electronic instruments, and computer systems.

B78-10083

**CALIBRATION TARGET FOR TEMPERATURE RADIOMETER**

S. F. EDWARDS, W. F. STEWART, and D. S. VANN

Jun. 1978

LANGLEY-12239

Vol. 3, No. 1, p. 89

Technique measures temperature/voltage drop characteristics of very thin filament. With constant current running through filament, voltage drop is recorded at various temperatures, as measured by calibrated thermocouple.

B78-10084

**RAPID LEAK DETECTION WITH LIQUID CRYSTALS**

R. M. HEISMAN (Rockwell Intern. Corp.), W. F. ICELAND

(Rockwell Intern. Corp.), and E. P. RUPPE (Rockwell Intern. Corp.)

Jun. 1978

MSC-13804

Vol. 3, No. 1, p. 90

Small leaks in vacuum lines are detected by applying liquid-crystal coating, warming suspected area, and observing color change due to differential cooling by leak jet. Technique is used on inside or outside walls of vacuum-jacketed lines.

B78-10085

**THERMAL-LEAK ANALYZER FOR VACUUM-JACKETED LINES**

R. M. HEISMAN (Rockwell Intern. Corp.), W. F. ICELAND

(Rockwell Intern. Corp.), and E. P. RUPPE (Rockwell Intern. Corp.)

Jun. 1978

MSC-16802

Vol. 3, No. 1, p. 91

Technique involves coating suspected area with water-soluble black paint that gives even, infrared emission. Painted area is warmed with heat gun; an infrared scanner is used to detect

cooled spot on jacket exterior. Introduction of atmospheric pressure into jacket intensifies leak jet and improves test sensitivity.

**B78-10086**  
**LONG-LASTING SOLID-POLYMER ELECTROLYTIC HY-  
GROMETER**  
D. D. LAWSON

Jun. 1978

**NPO-13948** Vol. 3, No. 1, p. 92

Device consists of hollow tube node of oxidation-resistant sulfonated fluorocarbon polymer. Tube absorbs moisture from air passing across inner and outer surfaces, causing change in polymer conductance. Change is related to change in water content in gas sample.

**B78-10087**  
**ULTRASONIC EVALUATION OF HIGH-VOLTAGE CIRCUIT  
BOARDS**

S. J. KLIMA and T. J. RILEY

Jun. 1978 See also NASA TM-X-73432 (N76-27475)

**LEWIS-12781** Vol. 3, No. 1, p. 94

Ultrasonic transmission technique, using reflector plate, indicates resistance to corona formation. Technique is useful as tool for mapping specific panels to permit selecting best areas of laminate for circuit board use. Procedure is relatively safe, fast, inexpensive, and uses commercially-available equipment.

**B78-10088**  
**FUSEHOLDERS ALLOW FAST SYSTEM CHECKOUT**

R. L. WOOTERS (Rockwell Intern. Corp.)

Jun. 1978

**MSC-16856** Vol. 3, No. 1, p. 95

Technique involves modifying fuseholder cap with drilled hole to allow each circuit to be connected to automatic circuit analyzer. Tester is commercially-available continuity device used for checking out wiring harnesses that sequentially steps from one circuit to the next automatically. Test results are printed.

**B78-10089**  
**WINDOW FLAW DETECTION BY BACKSCATTER LIGHTING**  
L. K. CROCKETT (Rockwell Intern. Corp.) and F. R. MINTON  
(Rockwell Intern. Corp.)

Jun. 1978

**MSC-16605** Vol. 3, No. 1, p. 96

Portable fiber-optic probe detects tiny flaws in transparent materials. Probe transmits light through surface to illuminate interior of material by backscattering off its edges. Light-sensitive contact paper records scratch pattern. Technique can be used for rapid visual checks. Flexible fiber optics are safely used in explosive or flammable areas; they present no hazard of breakage or contamination in controlled environments.

**B78-10090**  
**PREDICTING SURFACE HEAT FLUX**

D. M. CURRY and S. D. WILLIAMS (Lockheed Electronics Co.)

Jun. 1978 See also NASA TM-X-58176 (N76-20410); NASA TM-58204 (N77-27349)

**MSC-16095** Vol. 3, No. 1, p. 97

Report presents technique involving single embedded thermocouple used to predict flux and temperature for high-or-low conductivity materials that have temperature-and-pressure dependent properties. Technique solves for heat rate and temperature at given surface at each time step, rather than for entire history. Newton-Raphson technique is used for temperature solutions; then quadratic fit is employed. Report contains representative graphs and tables.

**B78-10091**  
**APPROACH AND LANDING SIMULATION**

A. J. OSTROFF and R. B. WOOD (Vought Missiles and Space Co.)

Jun. 1978

**LANGLEY-12060** Vol. 3, No. 1, p. 98

Computer program integrates avionics research in navigation, guidance, controls, and displays with realistic aircraft model. Program gives researchers capability of evaluating avionics area

independently from other research areas and thus allows more flexibility in time schedules. Program comprises many independent modules that represent specific hardware onboard actual aircraft.

**B78-10092**  
**STABILITY CHARACTERISTICS OF ELASTIC AIRPLANE**  
L. L. ERICKSON

Jun. 1978

**ARC-11144** Vol. 3, No. 1, p. 99

System of computer programs uses linear theories to evaluate static and dynamic stability, trim state, inertial, and aerodynamic loading, and elastic deformations of aircraft configurations at subsonic and supersonic speeds. Primary emphasis is on analysis of stability and control characteristics of flexible aircraft. System also solves simple rigid aerodynamic problems.

**B78-10093**  
**WAKE AND WASH**

F. O. SMETANA (North Carolina State Univ.) and D. C. SUMMEY  
(North Carolina State Univ.)

Jun. 1978

**LANGLEY-12262** Vol. 3, No. 1, p. 100

Two computer programs determine onset flow in vicinity of horizontal tail of light aircraft.

**B78-10094**  
**FLOW VELOCITIES AND STREAMLINES**

T. KATSANIS and W. D. MCNALLY

Jun. 1978 See also B74-10130

**LEWIS-12966** Vol. 3, No. 1, p. 100

Computer program calculates subsonic or transonic flow on hubshroud, midchannel, stream surface of single-blade row of turbomachine. Program uses finite-different and quasi-orthogonal (velocity-gradient) methods. Program is reported in two volumes: Part I is User's Manual, Part II is Programmer's Manual.

**B78-10095**  
**HYDRAULIC DYNAMIC ANALYSIS**

R. L. GALE (Rockwell Intern. Corp.), A. W. NEASE (Rockwell Intern. Corp.), and D. J. NELSON (Rockwell Intern. Corp.)

Jun. 1978

**MSC-16795** Vol. 3, No. 1, p. 101

Computer program mathematically describes complete hydraulic systems to study their dynamic performance. Program employs subroutines that simulate components of hydraulic system, which are then controlled by main program. Program is useful to engineers working with detailed performance results of aircraft, spacecraft, or similar hydraulic systems.

**B78-10096**  
**PERFORMANCE OPTIMIZING**

B. CLARK (Virginia Univ.), W. D. PILKEY (Virginia Univ.), and B. P. WANG (Virginia Univ.)

Jun. 1978

**LANGLEY-11930** Vol. 3, No. 1, p. 101

System of computer programs determines optimal behavior of structural-mechanical system subject to transient disturbances or loadings. Program makes it possible to approach design problem directly from design criteria without prior commitment to particular design concept.

**B78-10097**  
**DYNAMICS OF GAS-THRUST BEARINGS**

A. K. STIFFLER (Mississippi State Univ.) and R. R. TAPIA  
(Mississippi State Univ.)

Jun. 1978

**LEWIS-12754** Vol. 3, No. 1, p. 102

Computer program calculates load coefficients, up to third harmonic, for hydrostatic gas thrust bearings. Program is useful in identification of industrial situations where gas-thrust bearings have potential applications.

**B78-10248**  
**PSEUDO-CONTINUOUS-WAVE ACOUSTIC INSTRUMENT**  
J. S. HEYMAN and F. D. STONE

## 06 MECHANICS

Oct. 1978

**LANGLEY-12260** Vol. 3, No. 2, p. 257

Simple, inexpensive, and portable ultrasonic device accurately measures acoustic properties of liquids, gases, and solids, using pseudo-continuous wave responses from samples to measure change in resonant frequency or amplitude in acoustic signal.

**B78-10249**

**MASS SPECTROMETER CALIBRATION STANDARD**

D. S. ROSS

Oct. 1978

**NPO-14097** Vol. 3, No. 2, p. 258

Inert perfluorinated alkane and alkyl ethers mixture is used to calibrate mass spectrometer. Noncontaminating, commercially-available liquid provides series of reproducible reference peaks over broad mass spectrum that ranges over mass numbers from 1 to 200.

**B78-10250**

**DAMAGE-DETECTION SYSTEM FOR LNG CARRIERS**

J. R. MASTANDREA (McDonnell Douglas Corp.) and M. V. SCHERR (McDonnell Douglas Corp.)

Oct. 1978

**LANGLEY-11463** Vol. 3, No. 2, p. 258

System utilizes array of acoustical transducers to detect cracks and leaks in liquefied natural gas (LNG) containers onboard ships. In addition to detecting leaks, device indicates location and leak rate.

**B78-10251**

**FREE-AIR CONTENT IN FLUID SYSTEMS**

G. R. GUM (Rockwell Intern. Corp.)

Oct. 1978

**MSC-16703** Vol. 3, No. 2, p. 260

Nomograph used with compressibility tester automatically finds amount of free-air within closed fluid system. Device reduces time required for task and reduces likelihood of error.

**B78-10252**

**TESTING COMPOSITE SHEETS AT HIGH TEMPERATURES**

J. S. JONES (Rockwell Intern. Corp.) and B. J. PAYNE (Rockwell Intern. Corp.)

Oct. 1978

**MSC-16237** Vol. 3, No. 2, p. 260

Candidate materials for skins of flexural sandwich beams can be compressive- or tensile-tested at high temperature by using corrosion resistant steel (CRES) for core material. Tests with CRES core have been made at temperatures as high as 260 C. Future tests at temperatures above 371 C may be permissible.

**B78-10253**

**FLUIDIC-OSCILLATOR GAS ANALYZER**

E. A. FABER (Univ. of Florida)

Oct. 1978

**KSC-11014** Vol. 3, No. 2, p. 261

Fluidic oscillator identifies hazardous single, and multicomponent gases. Since oscillator has no moving parts, it is highly reliable.

**B78-10254**

**IMPROVED ELECTRON-BEAM PROBE FOR HYPERSONIC FLOWS**

A. D. MCRONALD

Oct. 1978

**NPO-13793** Vol. 3, No. 2, p. 261

Probe uses differentially-pumped drift tube to connect high and low pressure regions thereby allowing higher gas densities to be studied. System uses higher beam voltages (50 kV) and currents (1 mA delivered to gas), and extends boundary layer penetration up to 15.2 cm, and test duration to one hour.

**B78-10255**

**DETECTION OF BOUNDARY-LAYER TRANSITIONS IN WIND TUNNELS**

W. R. WOOD and D. M. SOMERS

Oct. 1978

**LANGLEY-12261** Vol. 3, No. 2, p. 263

Accelerometer replaces stethoscope in technique for detection of laminar-to-turbulent boundary-layer transitions on wind-tunnel models. Technique allows measurements above or below atmospheric pressure because human operator is not required within tunnel. Data may be taken from accelerometer, and pressure transducer simultaneously, and delivered to systems for analysis.

**B78-10256**

**HELICOPTER POSITION STABILIZING SYSTEM**

K. R. JENKIN (TRW, Inc.)

Oct. 1978

**LANGLEY-11670** Vol. 3, No. 2, p. 264

System utilizes vertical gyroscope mounted on telescope handled by onboard observer, to help helicopter pilot fly precise circles over ground target without use of ground observer. Other possible uses include cargo discharge or pickup without ground controller, and hovering over invisible target with known coordinates.

**B78-10257**

**AIRFRAME DESIGN FOR REDUCING CABIN NOISE**

G. L. GETLINE (Gen. Dy. Corp.)

Oct. 1978 See also NASA-CR-145104 (N77-15029)

**LANGLEY-12097** Vol. 3, No. 2, p. 265

Low-frequency noise might be reduced by stiffness-control of airframe structure.

**B78-10258**

**PREDICTING DAMAGE FROM EXPLODING VESSELS**

W. E. BAKER (Southwest Res. Inst.), R. L. BESSEY (Southwest Res. Inst.), J. J. KULESZ (Southwest Res. Inst.), G. A. OLOHAM (Southwest Res. Inst.), V. B. PARR (Southwest Res. Inst.), R. E. RICKER (Southwest Res. Inst.), and P. S. WESTINE (Southwest Res. Inst.)

Oct. 1978 See also NASA-CR-134906 (N76-19296)

**LEWIS-13042** Vol. 3, No. 2, p. 267

Workbook provides designer and safety engineer with best currently available technology for predicting damage and hazards from explosions of propellant tanks and bursts of pressure vessels.

**B78-10259**

**AIR CUSHION LANDING SYSTEM**

K. M. BOGHAMI (Foster Miller Assoc.), K. M. CAPTAIN (Foster Miller Assoc.), and R. B. FISH (Foster Miller Assoc.)

Oct. 1978

**LANGLEY-12303** Vol. 3, No. 2, p. 267

Static and dynamic performance of air cushion landing system is simulated in computer program that treats four primary ACLS subsystems: fan, feeding system, trunk, and cushion. Configuration of systems is sufficiently general to represent variety of practical designs.

**B78-10260**

**INTERNAL AND EXTERNAL 2-D BOUNDARY LAYER FLOWS**

M. E. CRAWFORD (Stanford Univ.) and W. M. KAYS (Stanford Univ.)

Oct. 1978

**LEWIS-13009** Vol. 3, No. 2, p. 268

Computer program computes general two dimensional turbulent boundary-layer flow using finite-difference techniques. Structure allows for user modification to accommodate unique problems. Program should prove useful in many applications where accurate boundary-layer flow calculations are required.

**B78-10261**

**STRESS ANALYSIS UNDER COMPONENT RELATIVE INTERFERENCE FIT**

C. M. TAYLOR (Univ. of Leeds, England)

Oct. 1978

**LEWIS-12911** Vol. 3, No. 2, p. 268

Finite-element computer program enables analysis of distortions and stresses occurring in components having relative interference. Program restricts itself to simple elements and axisymmetric loading situations. External inertial and thermal loads



may be applied in addition to forces arising from interference conditions.

**B78-10262****EDGE GEOMETRY OF TURBOMACHINE BLADES**

L. F. SCHUMANN (U. S. Army Air Mobility R and D Lab.)

Oct. 1978

**LEWIS-12979**

Vol. 3, No. 2, p. 269

Computer program calculates leading- and trailing-edge circle radii, tangency angles on leading- and trailing-edge circles, and stagger angle of turbomachinery blade sections, using only spline points defining blade surfaces.

**B78-10263****THERMAL PERFORMANCE OF SHAFT BEARING SYSTEM**

W. CRECELIUS (SKF Industries, Inc.)

Oct. 1978

**LEWIS-12761**

Vol. 3, No. 2, p. 269

Computer program calculates loads, torques, temperature, and fatigue life of multibearing shaft system operating with either wet or dry friction. Program is also capable of predicting system reactive to termination of lubricant supply to bearings and other lubricated mechanical elements.

**B78-10264****STRUCTURAL PERFORMANCE ANALYSIS AND REDESIGN**

W. D. WHETSTONE (Engineering Info. Sys. Co.)

Oct. 1978

**LANGLEY-12213; LANGLEY-12234; M-FS-23944**

Vol. 3, No. 2, p. 270

Program performs stress buckling and vibrational analysis of large, linear, finite-element systems in excess of 50,000 degrees of freedom. Cost, execution time, and storage requirements are kept reasonable through use of sparse matrix solution techniques, and other computational and data management procedures designed for problems of very large size.

**B78-10265****THERMAL HYDRAULIC ANALYZER**

E. E. GARCIA (Rockwell Intern. Corp.) and R. W. SANTEN (Rockwell Intern. Corp.)

Oct. 1978

**MSC-18014; MSC-16797; MSC-16877** Vol. 3, No. 2, p. 271

Program solves both transient and steady-state thermal problems, steady-state hydraulic problems, and combined thermal, and hydraulic transient or steady-state problems.

**B78-10266****ANALYSIS OF LINEAR VISCOELASTIC STRUCTURES**

K. K. GUPTA and E. HEER

Oct. 1978

**NPO-13197**

Vol. 3, No. 2, p. 271

General purpose program solves equilibrium problems associated with one-, two-, and three-dimensional linear thermoviscoelastic structures. Program can be used to analyze wide variety of structures constructed of any isotropic, orthotropic, or anisotropic material.

**B78-10377****NONCONTACT OPTICAL COMMUNICATION BETWEEN MOVING STATIONS**

D. C. CUNNINGHAM (Sperry Rand Corp.) and B. J. HAMILTON (Sperry Rand Corp.)

Jan. 1979

**LANGLEY-12283**

Vol. 3, No. 3, p. 399

Optical coupler allows non-contact data transfer between parts having several degrees of relative motion. Rotation about one axis and limited axial and radial motion will not interrupt communications.

**B78-10378****PHOTOVOLTAIC SYSTEMS TEST FACILITY**

Innovator not given (Lewis Research Center) Jan. 1979

**LEWIS-13073**

Vol. 3, No. 3, p. 400

Facility provides broad and flexible capability for evaluating photovoltaic systems and design concepts. As 'breadboard' system,

it can be used to check out complete systems, subsystems, and components before installation in actual service.

**B78-10379****RUBY C-AXIS ALIGNMENT SYSTEM**

R. C. CLAUSS and F. E. MCCREA

Jan. 1979

**NPO-14252**

Vol. 3, No. 3, p. 401

System locates C-axis of ruby slab fabricated for maser application to within + or - 3 minutes of arc at room temperature easier and faster than conventional procedures.

**B78-10380****MODULATION IMPROVES ELECTRO-OPTIC OBJECT DETECTOR**

J. R. CURRIE and R. R. SCHANSMAN

Jan. 1979

**M-FS-23776**

Vol. 3, No. 3, p. 402

Device as part of integrated circuit protection line is used to detect presence or absence of silicon wafer at point along air track. System is insensitive to ambient light and electrical noise, requires no special components or adjustments, operates from single supply source, and is relatively inexpensive to build.

**B78-10381****IMPROVED HEAT-PIPE WICK**

F. G. ARCELLA (Westinghouse Electric Corp.) and E. C. PHILLIPS, JR. (Westinghouse Electric Corp.)

Jan. 1979

**NPO-13391**

Vol. 3, No. 3, p. 403

Fabrication techniques in application with conventional heat pipe-wick technology produces high quality annular wicks with smaller pores, higher density, and greater rigidity.

**B78-10382****CALCULATION OF PLANAR-TRUSS MODAL FREQUENCIES**

R. M. GATES (Boeing Aerospace Co.)

Jan. 1979

**LANGLEY-12137**

Vol. 3, No. 3, p. 404

Simplified method for calculating modal frequencies of four types of large area planar trusses (tetrahedral, pentahedral, hexahedral, and radial rib) treat trusses as equivalent circular plates thus allowing classical plate theories to be used.

**B78-10383****IMPROVED NOTATION CONTROLLER**

J. DONOHUE and H. C. HOFFMAN

Jan. 1979

**GSFC-12273**

Vol. 3, No. 3, p. 404

Notation controller equipped with angular accelerometer stabilizes spinning bodies without precise positioning or calibration.

**B78-10384****HIGH-TEMPERATURE MICROPHONE SYSTEM**

A. J. ZUCKERWAR (Old Dominion Univ. Res. Foundation)

Jan. 1979

**LANGLEY-12375**

Vol. 3, No. 3, p. 405

Microphone system that measures pressure fluctuations in air or other gases is not unduly effected by temperature or rate-of-change of temperature. Easily fabricated system has proved operable at temperatures up to 430 C.

**B78-10385****A SOLID-STATE PHASE-INSENSITIVE ULTRASONIC TRANSDUCER**

J. S. HEYMAN

Jan. 1979

**LANGLEY-12304**

Vol. 3, No. 3, p. 406

Photoconductive acoustoelectric transducer (AET) functions as phase-insensitive ultrasonic transducer. Device is easy to use and requires no additional noisy components such as light or thermal source.

**B78-10386****NO2 MEASUREMENT BY CHEMILUMINESCENCE**

E. J. CONWAY, R. S. ROGOWSKI, and R. R. RICHARDS

## 06 MECHANICS

(Greenville College)

Jan. 1979

### LANGLEY-11378

Vol. 3, No. 3, p. 407

Compact device monitors specific chemiluminescent reaction of heated solid material such as 3,5 diaminobenzic or polyvinyl alcohol after contact with gas sample to detect and quantify nitrogen dioxide concentration.

### B78-10387

#### MEASURING POISSON'S RATIO IN ELASTOMERS

J. M. CLEMONS

Jan. 1979

### M-FS-23878

Vol. 3, No. 3, p. 408

Simple water-displacement device rapidly and accurately determines poisson's ratio for elastometric materials.

### B78-10388

#### CALIBRATION STANDARDS FOR PIND TESTS

S. GAUDIANO

Jan. 1979

### MSC-18169

Vol. 3, No. 3, p. 408

Calibrated set of microcircuit packages containing tiny particles with known masses can be used as reference standards for Particle-Impact Noise-Detection (PIND) tests.

### B78-10389

#### SHOCK DURING PIND TEST FREES PARTICLES

S. V. CARUSO and F. Z. KEISTER (Hughes Aircraft Co.)

Jan. 1979

### M-FS-23879

Vol. 3, No. 3, p. 409

Recent study on Particle-Impact Noise-Detection (PIND) shows impact at 1,500 to 4,000 G normally imparted to hybrid microcircuits during testing knocks loose stray trapped particle that can be subsequently removed. Process may be 80 to 90 percent effective in removal of particles depending on type of test utilized.

### B78-10390

#### TEMPERATURE-GRADIENT OVEN

S. JUE (Grumman Aerospace Corp.)

Jan. 1979

### M-FS-23919

Vol. 3, No. 3, p. 409

Tubular oven operates on principle of lengthwise linear temperature gradient of homogeneous conductive rod in absence of radiative or convective heat loss. Oven can be applied to controlled heating or cooling of test specimens.

### B78-10391

#### AUTOMATED TEMPERATURE-CYCLING APPARATUS

M. L. LOCKARD

Jan. 1979

### LANGLEY-12310

Vol. 3, No. 3, p. 410

Apparatus is used to test materials reaction to thermal shock by moving specimens between two chambers at high and low temperature extremes for specified number of cycles. Electrically motored system is completely automatic saving time and costs.

### B78-10392

#### STANDARDIZED GAS-TEMPERATURE PROBES

G. E. GLAWE, R. HOLANDA, and L. N. KRAUSE

Jan. 1979 See also NASA-TP-1099 (N78-15463)

### LEWIS-13059

Vol. 3, No. 3, p. 411

Standardization by two general probe designs and determination of various correction factors for range of sizes in each design reduces requirements for individual calibration and associated costs.

### B78-10393

#### ORIFICE CALIBRATION MODULE

R. CULOTTA and D. L. POSEY

Jan. 1979

### LANGLEY-12269

Vol. 3, No. 3, p. 412

Module, consisting of transparent plastic cylinder containing separate suction and calibration chambers, allows static-pressure orifices to be calibrated, and rapidly checked for leaks.

Device is compact, saves time, and improves accuracy, and reliability of pressure measurements.

### B78-10394

#### ELECTRONICALLY-SCANNED PRESSURE MEASUREMENT SYSTEM

T. BASTA, JR., C. GROSS, and D. B. JUANARENA

Jan. 1979

### LANGLEY-12386

Vol. 3, No. 3, p. 413

Sensor and associated microcomputer-based data acquisition unit can measure up to 1,024 unknown pressures at data rates as high as 10 kHz with maximum system inaccuracies of + or - 0.25 percent of full scale. System can be calibrated in place, making it easy to calibrate between runs for high cost or short run time wind tunnel testing.

### B78-10395

#### STATIC-PRESSURE PROBE FOR SMALL GEOMETRIES

S. Z. PINCKNEY

Jan. 1979 See also NASA-TN-D-7978 (N75-27305)

### LANGLEY-11552

Vol. 3, No. 3, p. 414

Contoured pressure probe with static orifices located near tip is more effective than conventional probes in taking measurements in small high-Reynolds number geometries such as nozzles or flow inlets. Probe is less sensitive to pressure gradients and off axis variations in flow directions over short distances.

### B78-10396

#### DETECTING SERVO FAILURES WITH SOFTWARE

D. LEW (Rockwell Intern. Corp.) and R. QUAM (Rockwell Intern. Corp.)

Jan. 1979

### FRC-11003

Vol. 3, No. 3, p. 415

Program detects hardware failure in servosystems by comparing actual servo valve position with predictions of software model. In addition, system will also pick up most computer input/output failures. Process presents faster and more reliable results than previous failure detection methods.

### B78-10397

#### PENETRATING FIRE EXTINGUISHER

N. C. GRAY, P. N. BOLTON (Boeing Co.), and R. M. SENSEY

(Boeing Co.)

Jan. 1979

### KSC-11064

Vol. 3, No. 3, p. 416

Fire extinguisher with replaceable hard pointed tip is used to penetrate metal skins, wall panels, and other barriers and inject fire extinguishing chemicals.

### B78-10398

#### HIGH-TEMPERATURE CAPACITIVE PRESSURE TRANSDUCER

R. L. EGGER (Boeing Aerospace Co.), R. A. MICKELSEN (Boeing Aerospace Co.), D. W. NELSON (Boeing Aerospace Co.), and E. J. NELSON (Boeing Aerospace Co.)

Jan. 1979 See also NASA-CR-135282 (N77-33483)

### LEWIS-13078

Vol. 3, No. 3, p. 416

Capacitive pressure transducer operates continuously at temperatures as high 1,2000 F, and has been evaluated over full-scale differential pressure range of + or - 10 psi (69 x 1000 N/sq m).

### B78-10399

#### DIRECTORY OF FIRE RESEARCH SPECIALISTS

T. L. JUNOD, G. MANDEL, and N. H. JASON (NES)

Jan. 1979 See also NASA-CR-135089 (N77-30271)

### LEWIS-13123

Vol. 3, No. 3, p. 417

Directory indexes, 1,475 researchers and various organizations in the United States or Canada who have recently participated in or made contributions to fire science research or related areas of concern.

### B78-10400

#### NACELLE INCREMENTAL DRAG

A. W. KNUDSEN (Rockwell Intern. Corp.) and R. Y. MAIRS (Rockwell Intern. Corp.)

Jan. 1979

**LEWIS-12786****Vol. 3, No. 3, p. 417**

Program is used to provide rapid approximate methodology for comparing alternative propulsion system designs for supersonic transports.

**B78-10401****WING AERODYNAMICS UNDER BLOWING JETS**

C. H. FOX, JR., G. L. FILLMAN (Univ. of Kansas), and C. E. LAN (Univ. of Kansas)

Jan. 1979

**LANGLEY-12256****Vol. 3, No. 3, p. 418**

Program determines aerodynamic characteristics of arbitrary wings under influence of single centered jet of pair of jets blowing on or above plane of wing.

**B78-10402****ANALYSIS OF BEAM COLUMNS**

L. I. GUIDRY (Rockwell Intern. Corp.)

Jan. 1979

**MSC-18009****Vol. 3, No. 3, p. 418**

FORTAN IV program determines displacements, bending moments, and critical column loads for straight elastic beams or column beams.

**B78-10403****SOLAR-ELECTRIC GEOCENTRIC TRANSFER**

H. L. MALCHOW (Charles Stark Draper Lab., Inc.) and L. L. SACKETT (Charles Stark Draper Lab., Inc.)

Jan. 1979

**LEWIS-12939****Vol. 3, No. 3, p. 419**

Time-optimal or nearly-time-optimal trajectory computer program developed for solar-electric geocentric transfer considers yaw motion only, yaw and roll only, and unconstrained motion configurations.

**B78-10404****CONVECTIVELY COOLED STRUCTURES**

A. R. WIETING and E. A. THORNTON (Old Dominion Univ.)

Jan. 1979

**LANGLEY-12347****Vol. 3, No. 3, p. 419**

Finite-element program called TAP 1 aids in steady state thermal analysis of structures that employ conductive or convective heat transfer.

**B78-10405****ANALYSIS OF CRACKED ORTHOTROPIC SHEETS**

J. A. ABERSON (Georgia Inst. of Tech.), J. M. ANDERSON (Georgia Inst. of Tech.), W. J. BATDORF (Lockheed-Georgia Co.), and C. CHU (Lockheed-Georgia Co.)

Jan. 1979

**LANGLEY-12288****Vol. 3, No. 3, p. 420**

Computer program performs two dimensional elastostatic analysis of plane anisotropic homogeneous sheets with through-the-thickness cracks and temperature gradients.

**B78-10406****PREDICTING ROTOR ROTATION NOISE**

R. N. HOSIER (USAAMRDL), R. RAMAKRISHNAN (George Washington Univ.), and D. RANDALL (Computer Sci. Corp.)

Jan. 1979

**LANGLEY-12098****Vol. 3, No. 3, p. 420**

Program uses multiple sets of measured or hypothetical high-frequency blade-loading coefficients to calculate rotational noise of stationary helicopter rotors.

**B78-10534****REAL-TIME INSTRUMENT AVERAGES 100 DATA SETS**

A. G. BIRCHENOUGH, W. J. RICE, and G. B. TOMA

Mar. 1979 See also NASA-TP-1055 (N78-11301)

**LEWIS-13093****Vol. 3, No. 4, p. 567**

Instrument generates average curve of 100 consecutive cycles of any function that occurs as time varying electrical signal. Device has been used to average parameters on 1975 Chevrolet V-8 engine, and on Continental six cylinder aircraft engine.

**B78-10535****MINIATURE THERMOCOUPLE DISCONNECT**

K. L. QUINN

Mar. 1979

**LANGLEY-12013****Vol. 3, No. 4, p. 568**

Commercially available subminiature connector modified for utilization with both flexible and small diameter metal-sheathed thermocouples results in reliable thermocouple for instrumentation on wind-tunnel models smaller than commercial disconnects normally used.

**B78-10536****HIGH-SAMPLING-RATE PRESSURE TRANSDUCER HAS IN SITU CALIBRATION**

C. GROSS

Mar. 1979

**LANGLEY-12230****Vol. 3, No. 4, p. 569**

High-data-rate pressure sensor module can be calibrated after it is attached to an experimental setup. Electrically multiplexed sensor is designed for use in wind-tunnels and other applications requiring accurate measurement of many pressures in a short period of time.

**B78-10537****SHOCK-SWALLOWING AIR SENSOR**

J. NUGENT, G. M. SAKAMOTO, L. D. WEBB, and L. M. COUCH (Langley Res. Center)

Mar. 1979

**FRC-10107****Vol. 3, No. 4, p. 570**

An air-data probe allows air to flow through it so that supersonic and hypersonic shock waves form behind pressure measuring orifices and tube instead of directly on them. Measured pressures are close to those in free-flowing air and are used to determine mach numbers of flying aircraft.

**B78-10538****MEASURING PROJECTILE SPEED**

J. E. JORDAN and P. C. KASSEL, JR.

Mar. 1979

**LANGLEY-12387****Vol. 3, No. 4, p. 571**

Apparatus uses optoelectric detector to measure station-to-station time-of-flight of small spherical aluminum projectile down steel barrel. Instrument has been used to study impact resistance of composite materials used in aircraft structural research program.

**B78-10539****MINIATURE VELOCIMETER**

J. M. FRANKE, W. W. HUNTER, JR., J. F. MEYERS, and S. L. OCHELTREE

Mar. 1979

**LANGLEY-12281****Vol. 3, No. 4, p. 572**

Laser velocimeter (LV) designed to use semiconductor-diode laser is 100 times smaller than continuous-wave gas-laser velocimeter permitting mounting within wind-tunnel models or on engine walls. Mini LV uses only 0.4 watts of power and measures velocities with accuracy of 98% or better.

**B78-10540****MULTIPLE-SAMPLE HOLDER FOR IC TESTING**

R. F. HAACK

Mar. 1979

**NPO-14314****Vol. 3, No. 4, p. 573**

Carrousel tray speeds up testing process by feeding mass spectrometer up to 12 sealed integrated circuit packages in rapid succession for analysis of contaminants and total gas composition.

**B78-10541****SEM PROBE OF IC RADIATION SENSITIVITY**

M. K. GAUTHIER and A. G. STANLEY

Mar. 1979

**NPO-14350****Vol. 3, No. 4, p. 574**

Scanning Electron Microscope (SEM) used to irradiate single integrated circuit (IC) subcomponent to test for radiation sensitivity can localize area of IC less than .03 by .03 mm for determination of exact location of radiation sensitive section.

**B78-10542**

**TOPPING PRESSURE FOR GAS-STORAGE CYLINDERS**

R. L. HABEN (Rockwell Intern. Corp.)

Mar. 1979

**MSC-18186**

**Vol. 3, No. 4, p. 575**

With charts derived from gas-storage system model, required topping pressure can be determined from initial cylinder pressure and temperature of gas entering cylinder. Charts are available for hydrogen and oxygen and can be developed for other important industrial gases as well.

**B78-10543**

**DYNAMIC MEASUREMENT OF BULK MODULUS**

W. L. DOWLER and L. D. STRAND

Mar. 1979

**NPO-13226**

**Vol. 3, No. 4, p. 576**

Technique based on measuring phase difference between microwave reference and test signals and has been used to determine change in bulk modulus of solid-fuel rocket propellants should be useful in studying other dielectric materials.

**B78-10544**

**ELASTIC DEFORMATION OF BALL BEARINGS, GEARS, AND CAMS**

B. J. HAMROCK and D. E. BREWE (U.S. Army Res. and Development Labs.)

Mar. 1979 See also NASA-TM-X-3407 (N76-26517); B77-10414; B77-10415

**LEWIS-13076**

**Vol. 3, No. 4, p. 577**

Simplified technique aids designers in calculation of elastic deformation at center of contact area for ball bearings, gears, cams, and similar components.

**B78-10545**

**COMPACT TURBIDITY METER**

J. G. HIRSCHBERG (Univ. of Miami)

Mar. 1979

**KSC-11063**

**Vol. 3, No. 4, p. 578**

Proposed monitor that detects back-reflected infrared radiation makes in situ turbidity measurements of lakes, streams, and other bodies of water. Monitor is compact, works well in daylight as at night, and is easily operated in rough seas.

**B78-10546**

**AUTOMATED INSPECTION OF WIRE-FRAME ASSEMBLIES**

J. G. ETZEL and J. A. MUNFORD

Mar. 1979

**GSFC-12321**

**Vol. 3, No. 4, p. 579**

System improves accuracy of measurement between spaces of wire mesh and other wire frame assemblies while significantly reducing inspection time. Device operates automatically producing printout of measured spacings through use of optical scanner.

**B78-10547**

**DETECTING SURFACE DEFORMATIONS PHOTOGRAPHICALLY**

L. D. BECKERLE (Rockwell Intern. Corp.) and J. R. ROBSON (Rockwell Intern. Corp.)

Mar. 1979

**MSC-16156**

**Vol. 3, No. 4, p. 580**

Simple photographic technique detects cracks and changes as small as 0.08 mm in surface contours of opaque objects subjected to environmental and other tests.

**B78-10548**

**COMPRESSION TESTING OF FLAMMABLE LIQUIDS**

O. M. BRILES (Sundstrand Advanced Technology Operations) and R. P. HOLLENBAUGH (Sundstrand Advanced Technology Operations)

Mar. 1979

**MSC-16121**

**Vol. 3, No. 4, p. 581**

Small cylindrical test chamber determines catalytic effect of given container material on fuel that might contribute to accidental deflagration or detonation below expected temperature under adiabatic compression. Device is useful to producers and users of flammable liquids and to safety specialists.

**B78-10549**

**ACOUSTIC-OPTICAL IMAGING WITHOUT IMMERSION**

H. LIU (LUMIN INC.)

Mar. 1979

**M-FS-23876**

**Vol. 3, No. 4, p. 582**

System using membranous end wall of Bragg cell to separate test specimen from acoustic transmission medium, operates in real time and uses readily available optical components. System can be easily set up and maintained by people with little or no training in holography.

**B78-10550**

**DETECTING MOISTURE IN COMPOSITE HONEYCOMB PANELS**

J. D. CULP (McDonnell Douglas Corp.) and J. W. SAPP, JR. (McDonnell Douglas Corp.)

Mar. 1979

**MSC-16750**

**Vol. 3, No. 4, p. 583**

Radiographic inspection technique detects liquids trapped in cells of honeycomb composite panels constructed with porous fiber-reinforced plastic skins. Procedure is of use in industries such as aerospace or automotive engineering where honeycomb composites are being used or studied.

**B78-10551**

**REFRIGERANT LEAK DETECTOR**

E. J. BYRNE (Rockwell Intern. Corp.)

Mar. 1979

**MSC-18214**

**Vol. 3, No. 4, p. 583**

Quantitative leak detector visually demonstrates refrigerant loss from precision volume of large refrigeration system over established period of time from single test point. Mechanical unit is less costly than electronic 'sniffers' and is more reliable due to absence of electronic circuits that are susceptible to drift.

**B78-10552**

**'GENTLE' HOLDER FOR BRITTLE CERAMICS**

E. G. STEVENS (Rockwell Intern. Corp.)

Mar. 1979

**MSC-19645**

**Vol. 3, No. 4, p. 585**

Fixture uses commercially available flexible refractory fabric to gently hold brittle ceramic specimens for alignment during high temperature tests up to 2000 F and above. Assembly is held at both ends by water cooled straps that keep fabric/fixture bond area cold during tests.

**B78-10553**

**POTENTIAL FLOWS IN PROPULSION SYSTEM INLETS**

C. A. FARRELL, JR. and N. O. STOCKMAN

Mar. 1979

**LEWIS-13010**

**Vol. 3, No. 4, p. 586**

Collection of computer programs used to calculate compressible potential flow in arbitrary axisymmetric inlet at any combination of operating conditions of inlet mass-flow rate, free stream velocity, and incident angle proves useful in development of wide variety of propulsion system inlet designs.

**B78-10554**

**ORBITAL HEAT RATE PACKAGE**

J. K. LOVIN (Lockheed Missiles and Space Co.) and L. W. SPRADLEY (Lockheed Missiles and Space Co.)

Mar. 1979

**M-FS-23980**

**Vol. 3, No. 4, p. 586**

Package consisting of three separate programs used to accurately predict temperature distribution of spacecraft in planetary orbit is invaluable tool for design and analysis of other structures that must function in complex thermal environment.

**B78-10555**

**TUMBLING-VEHICLE ENTRY HEATING**

C. D. ENGEL (REMTECH, Inc.)

Mar. 1979

**M-FS-23712**

**Vol. 3, No. 4, p. 587**

Programs rapidly determines heating rate for any point on

vehicle at any angle of attack or roll position during reentry into earth's atmosphere. Package can be used to accurately find heating environment for numerous points on vehicle as function of time for thermal protection systems or structural breakup studies.

**B78-10556****FLOW IN AXISYMMETRIC DUCTS WITH STRUTS**

O. L. ANDERSON (United Aircraft Corp.)

Mar. 1979

**LEWIS-12798**

Vol. 3, No. 4, p. 588

Program provides accurate analytical tool for development of optimum diffuser design for wide range of applications.

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**B78-10098****RIGID COUPLING IS ALSO FLEXIBLE**

W. T. APPLEBERRY (Rockwell Intern. Corp.)

Jun. 1978

**MSC-16488**

Vol. 3, No. 1, p. 105

Spring-loaded coupling is rigid under light loads and swivels under higher loads. Break-out point can be set at any desired value by selecting appropriate preload springs. Coupling requires no cushions or elastomeric joints that limit temperature range.

**B78-10099****COMPACT PRESSURE-LINE COUPLING**

J. W. GUEST (Rockwell Intern. Corp.)

Jun. 1978

**MSC-16893**

Vol. 3, No. 1, p. 106

Coupling saves space by using socket screws to compress gasket. Device can be installed in hard-to-reach locations.

**B78-10100****PLASMA IGNITER FOR INTERNAL-COMBUSTION ENGINES**

R. R. BRESHEARS and D. J. FITZGERALD

Jun. 1978

**NPO-13828**

Vol. 3, No. 1, p. 106

Hot ionized gas (plasma) ignites air/fuel mixture in internal combustion engines more effectively than spark. Electromagnetic forces propel plasma into combustion zone. Combustion rate is not limited by flame-front speed.

**B78-10101****SELF-CENTERING STEPPED PISTON**

I. ETSION and B. J. HAMROCK

Jun. 1978 See also NASA TN-D-8345 (N77-11402)

**LEWIS-12997**

Vol. 3, No. 1, p. 108

Device centers itself within cylinder, allowing minimum leakage past piston.

**B78-10102****COMPACT PISTON-POSITION SENSOR**

M. O. DUSTIN

Jun. 1978

**LEWIS-12392**

Vol. 3, No. 1, p. 109

Strain gage measures position of spring-loaded piston without interfering with its motion.

**B78-10103****MODIFIED PIPE EXTENSION SAFELY RELEASES CHAIN BINDERS**

D. W. HAW (Rockwell Intern. Corp.)

Jun. 1978

**MSC-16937**

Vol. 3, No. 1, p. 110

Pipe, cut partly in half lengthwise, and cupped and notched at one end, safely releases tension in chain binders that cinch

tiedown chains around truck loads. Device prevents binder-handle from being thrown violently during release.

**B78-10104****MAGNETOSTRICTIVE VALVE**

C. C. CASABIANCA

Jun. 1978

**NPO-14235**

Vol. 3, No. 1, p. 111

Device requires no moving parts and has less stringent tolerances. Device uses magnetostrictive powdered metal and electromagnets, rather than solenoid. Device is more reliable than conventional valves.

**B78-10105****BOOSTING THE POWER OF TWO-STAGE ENGINES**

J. HOUSEMAN

Jun. 1978

**NPO-14057**

Vol. 3, No. 1, p. 112

Low-pollution advantages are retained and power output increased if first stage operates on two-stroke cycle.

**B78-10106****PRECISION FLUID-PRESSURE REGULATOR**

A. R. MCDOUGAL

Jun. 1978

**NPO-13370**

Vol. 3, No. 1, p. 113

Reshaping of metering orifice improves pressure control and stability. Slotted hollow pintle replaces poppet to increase linear motion required to obtain given pressure drop.

**B78-10107****DESIGN OF TRANSMISSION SHAFTING**

S. H. LOEWENTHAL

Jun. 1978 See also NASA TM-X-73639 (N77-20482)

**LEWIS-12965**

Vol. 3, No. 1, p. 114

Formula considers flexure fatigue characteristics of shaft material under combined cyclic bending and static torsion stress. Formula permits selecting shaft sizes that meet common loading conditions without adding on excessive shaft material. Formula is applicable to design of rotary power or torque transmission shafting external to machine elements.

**B78-10108****'NONFLOATING' UNIVERSAL JOINT**

W. T. APPLEBERRY (Rockwell Intern. Corp.)

Jun. 1978

**MSC-19546**

Vol. 3, No. 1, p. 115

Modified crowned-spline joint is lightweight, durable, and requires minimum of parts. It does not use rubber cushions to limit play and is useful over wide temperature range. It has inner ball and socket to provide rigid connection with no axial play. Joint can be adapted to form pinned connection between segmented torque tubes.

**B78-10109****FLICKING-WIRE DRAG TENSIONER**

M. A. DASSELE (Sperry Rand Corp.) and H. FAIRALL (Sperry Rand Corp.)

Jun. 1978

**MSC-16367**

Vol. 3, No. 1, p. 116

Wire-drag system improves wire profile and applies consistent drag to wire. Wire drag is continuously adjustable from zero drag to tensile strength of wire. No-sag wire drag is easier to thread than former system and requires minimal downtime for cleaning and maintenance.

**B78-10110****SIMPLE AIR-PISTON GAS-SAMPLING SYSTEM**

T. W. NYLAND

Jun. 1978

**LEWIS-12922**

Vol. 3, No. 1, p. 117

System traps contaminant-free samples without using mechanical pumps.

**B78-10111****DUAL RELIEF-VALVE SYSTEM**

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J. R. KARNs and W. R. LATTA  
Jun. 1978

**LANGLEY-12267** Vol. 3, No. 1, p. 118

System allows removal and recertification of pressure-relief valve without compromising safety requirements or depressurizing pressure vessels.

### **B78-10267 METER FOR VERY SLOW FLOWS**

W. J. BAXTER, JR. (Orion Res. Inc.), M. S. FRANT (Orion Res. Inc.), and S. J. WEST (Orion Res. Inc.)  
Oct. 1978 See also B78-10233

**MSC-18112** Vol. 3, No. 2, p. 275

Solid-state sensing unit developed for use with NASA's Water-Quality Monitoring System can detect small velocity changes in slow moving fluid. Nonprotruding sensor is applicable to numerous other uses requiring sensitive measurement of slow flows.

### **B78-10268 WIND-WHEEL ELECTRIC POWER GENERATOR**

J. W. KAUFMAN

Oct. 1978

**M-FS-23515** Vol. 3, No. 2, p. 277

Windpowered electric generator mounted in protective housing unit has improved efficiency and reliability.

### **B78-10269 SUBMINIATURE HYDRAULIC ACTUATOR**

F. D. SEVART (Boeing Co.)

Oct. 1978

**LANGLEY-11522** Vol. 3, No. 2, p. 277

Subminiature, single-vane rotary actuator for wind-tunnel test-model control-surface actuation systems presents severe torque and system band-pass requirements with stringent space and weight limitations. Actuator has very low leakage of fluid from one side to other, permitting use in precision position servo-systems.

### **B78-10270 EMERGENCY ESCAPE DEVICE**

J. L. BURCH

Oct. 1978

**M-FS-23235** Vol. 3, No. 2, p. 278

Modified egress mechanism used to deploy Lunar Roving Vehicle, could be used in shipping, safety exits, amusement parks, and other applications to gently lower people or equipment several hundred feet.

### **B78-10271 ULTRASONIC EXTENSOMETER MEASURES BOLT PRE-LOAD**

C. M. DANIELS, JR. (Rockwell Intern. Corp.)

Oct. 1978

**M-FS-19337** Vol. 3, No. 2, p. 278

Extensometer using ultrasonic pulse reflections to measure elongations in tightened belts and studs is much more accurate than conventional torque wrenches in application of specified preload to bolts and other threaded fasteners.

### **B78-10272 AIRCRAFT TRAILING VORTEX HAZARD ALLEVIATORS**

D. R. CROOM

Oct. 1978 See also NASA TN-D-8162 (N76-18041); NASA TN-D-8360 (N77-11968); NASA TN-D-8373 (N77-21404); NASA SP-409 (N78-12017)

**LANGLEY-12034** Vol. 3, No. 2, p. 280

Wind-tunnel tests show that existing flight spoilers on large wide-body jet transport aircraft can be used to reduce vortex hazard for trailing aircraft.

### **B78-10273 COMPACT RATCHET WRENCH**

E. J. STRINGER (Rockwell Intern. Corp.)

Oct. 1978

**M-FS-24252** Vol. 3, No. 2, p. 281

Round ratchet wrench handle that fits into palm can be inserted into most areas that are inaccessible to wrenches with conventional handles.

### **B78-10274 WIDE-TEMPERATURE CORROSION-RESISTANT PRESSURE REGULATOR**

H. WICHMANN (Marquardt Co.)

Oct. 1978

**NPO-13776** Vol. 3, No. 2, p. 281

Simplified design and all-metal-and-ceramic-components make pressure regulator compatible with corrosive fluids such as fluorine and hydrazine, and extends operating-temperature range. Flexure guidance eliminates hysteresis and friction, and self-generated contaminations are diminished enough to produce nearly unlimited maintenance-free lifetime.

### **B78-10275 LOW-FREQUENCY VIBRATION ISOLATION**

D. C. MILLER and D. H. OTTH

Oct. 1978

**NPO-13915** Vol. 3, No. 2, p. 282

Viscoelastic shear dampers help eliminate microinch deflections resulting from low frequency vibrations. Dampers are applicable to control of tones and resonances in record players and turntables and other audio engineering equipment where vibration isolation is critical.

### **B78-10276 SIMPLER VALVE FOR RECIPROCATING ENGINES**

J. W. AKKERMAN

Oct. 1978

**MSC-16239** Vol. 3, No. 2, p. 283

Simpler design eliminating camshafts, cams, and mechanical springs should improve reliability of hydrazine powered reciprocating engines. Valve is expected to improve efficiency, and reduce weight of engines in range up to 50 horsepower.

### **B78-10277 DUAL-ACTION EXPANDED-LATCH MECHANISM**

R. A. SPENCER (Martin Marietta Corp.), J. R. TEWELL (Martin Marietta Corp.), and W. H. TOBEY (Martin Marietta Corp.)

Oct. 1978

**M-FS-23557** Vol. 3, No. 2, p. 285

Single drive actuator operates novel mechanism that expands, attaches to object, and withdraws to latch object firmly to another part. Packaging is extremely simple and compact, and eliminates need for machined parts or close tolerances.

### **B78-10278 A SHARP KNIFE FOR HIGH TEMPERATURES**

R. M. HEISMAN (Rockwell Intern. Corp.) and W. F. ICELAND (Rockwell Intern. Corp.)

Oct. 1978

**MSC-16932** Vol. 3, No. 2, p. 285

Electrically heated nickel-chrome-steel alloy knife may be used to cut heat resistant plastic felt and similar materials with relative ease. Blade made of commercially available alloy RA 330 retains edge at temperatures as high as 927 C.

### **B78-10279 ADHESIVE-REMOVAL TOOL**

C. C. HAYNIE (Rockwell Intern. Corp.)

Oct. 1978

**MSC-19498** Vol. 3, No. 2, p. 286

Air-driven hand-held tool with acrylic cutting blade removes adhesives and paint from surfaces. Sidewise-slicing motion of cutter eliminates tendency to 'bounce' on resilient materials.

### **B78-10280 COLLAPSIBLE MODULE EXTENDS TENFOLD IN HEIGHT**

A. R. MCDOUGAL

Oct. 1978

**NPO-13371** Vol. 3, No. 2, p. 287

Low-cost hollow module rapidly converts into elevated platform for field applications. Module can be used as support

for communication antennas or for TV or movie cameras operated by news reporters. Alternatively, it can be used as extendible boom on vehicles.

**B78-10281****THREE-PHASE INDUCTION MOTORS**

M. E. WOOD and N. A. DEMERDASH (Virginia Polytechnic Inst.)  
Oct. 1978

**MSC-16904**

Vol. 3, No. 2, p. 288

Program simulates performance characteristics of three-phase induction motors under normal conditions and extreme temperature, frequency, voltage magnitude, and voltage balance.

**B78-10407****COUPLER FOR MOVING VEHICLES**

A. A. RUDDMANN

Jan. 1979

**GSFC-12322**

Vol. 3, No. 3, p. 423

Coupler for two moving vehicles gradually orients and retains target vehicle, avoiding any abrupt contact with parent vehicle. Mechanism gently releases captured vehicle with approximate speed and direction of parent vehicle. Coupler may be applicable to deployment and retrieval of oceanographic research equipment and vessels or coupling of aircraft in flight.

**B78-10408****QUICK LOCKING/UNLOCKING RETAINER**

G. OKAMOTO (Rockwell Intern. Corp.) and B. B. WILLIAMS (Rockwell Intern. Corp.)

Jan. 1979

**MSC-18048**

Vol. 3, No. 3, p. 424

Spring clip retainer may prove more convenient than clamps or wingnut and stud combination when holding two small parts together in test fixtures and other applications where parts must be frequently moved or changed.

**B78-10409****ANTIBACKOFF LOCK FOR NUTS AND BOLTS**

J. M. FEALY

Jan. 1979

**MSC-16472**

Vol. 3, No. 3, p. 425

Simple lock, designed for hydraulic system, is used to keep any nut or bolt in place under vibration.

**B78-10410****DEVICE FOR PITCHING OFF METAL TUBES**

E. O. STENGARD

Jan. 1979

**GSFC-12274**

Vol. 3, No. 3, p. 426

Toggle mechanism is used to trap gas samples within small diameter metal tubes. Device is easily actuated and seals off without fracture.

**B78-10411****SPRING CONTROL OF WIRE HARNESS LOOPS**

P. J. CURCIO (Fairchild Republic Co.)

Jan. 1979

**MSC-18246**

Vol. 3, No. 3, p. 426

Negator spring control guides wire harness between movable and fixed structure. It prevents electrical wire harness loop from jamming or being severed as wire moves in response to changes in position of aircraft rudder. Spring-loaded coiled cable controls wire loop regardless of rudder movement.

**B78-10412****NONCONTACTING VALVE-POSITION INDICATOR**

E. A. CROVELLA (Carleton Controls Corp.), R. D. CUMMINS (Carleton Controls Corp.), and J. M. WADA (Rockwell Intern. Corp.)

Jan. 1979

**MSC-16048**

Vol. 3, No. 3, p. 427

Position of sealed valve or other movable part is indicated without penetrating housing. Flux from magnets connected to stem of hydraulic valve penetrates pressure wall and is sensed by Hall-effect transducer outside wall. When valve closes, moving

stem and magnets, voltage from transducer decreases; thus, stem position is indicated without physical contact.

**B78-10413****IMPROVED GAS THRUST BEARINGS**

W. J. ANDERSON and I. ETSION

Jan. 1979 See also NASA-TN-D-8279 (N76-29598); NASA-TN-D-8221 (N76-24588)

**LEWIS-12569**

Vol. 3, No. 3, p. 428

Two variations of gas-lubricated thrust bearings extend substantially load-carrying range over existing gas bearings. Dual-Action Gas Thrust Bearing's load-carrying capacity is more than ninety percent greater than that of single-action bearing over range of compressibility numbers. Advantages of Cantilever-mounted Thrust Bearing are greater tolerance to dirt ingestion, good initial lift-off characteristics, and operational capability over wide temperature range.

**B78-10414****QUICK-CONNECT THREADED ATTACHMENT JOINT**

M. H. LUCY, W. R. MESSICK, and P. VASQUEZ

Jan. 1979

**LANGLEY-12232**

Vol. 3, No. 3, p. 430

Joint is self-aligning and tightens with only sixty-five degrees of rotation for quick connects and disconnects. Made of injection-molded plastics or cast or machined aluminum, joint can carry wires, tubes, liquids, or gases. When two parts of joint are brought together, their shapes align them. Small projections on male section and slots on female section further aid alignment; slight rotation of male form engages projections in slots. At this point, threads engage and male section is rotated until joint is fully engaged.

**B78-10415****SIMULATOR FOR TRAINING REMOTE-MANIPULATOR OPERATORS**

D. H. ORR (McDonnell Douglas Corp.) and L. C. WARD (McDonnell Douglas Corp.)

Jan. 1979

**MSC-14921**

Vol. 3, No. 3, p. 431

Six-degree-of-freedom simulator uses economical components. Reduction in complexity makes this or similar system cost-effective for training manipulator operators, such as those in industries handling nuclear wastes and hazardous chemicals.

**B78-10416****SHAFT SPEED CONTROL**

A. G. FORD

Jan. 1979

**NPO-14170**

Vol. 3, No. 3, p. 432

Simple mechanism controls rotation of heavy-duty shaft by mechanical comparison with rotation of small, precise, stepper motor. Mechanism can be used to limit winding and unwinding speeds of large spools and reels and to control speed of other rotating shafts. Setup incorporates reference shaft geared down from stepper motor and feedback shaft geared up from shaft to be controlled. Feedback and reference shafts are coupled with brake assembly inside stationary cylinder. When work shaft speeds up, brakes are activated automatically to slow it down.

**B78-10417****STABLE HYDRAULIC PRESSURE REGULATOR**

H. GOLD

Jan. 1979 See also NASA-TM-X-73687 (N78-10415)

**LEWIS-13058**

Vol. 3, No. 3, p. 433

Neither sensing line restrictors nor frictional dampers are required for stability. Analysis presents method by which stability margin, response, and droop magnitude can be incorporated during design of direct-acting hydraulic pressure regulators.

**B78-10418****LATCHING SOLENOID FOR CRYOGENIC VALVES**

W. S. WANG (Consolidated Controls Corp.)

Jan. 1979

**MSC-18106**

Vol. 3, No. 3, p. 434

Pull-in and Delatching Coils of cryogenic solenoid contain

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copper and low-resistance, low-temperature-coefficient alloy to limit current at low temperatures.

**B78-10419**

### **INSULATOR FOR CRYOGENIC JOINTS**

E. L. HAWKINSON (Rockwell Intern. Corp.)

Jan. 1979

**M-FS-19361**

**Vol. 3, No. 3, p. 435**

Semirigid polyurethane foam is firm enough not to collapse yet soft enough not to crack in extreme cold. Silicone cover retards flames and glass-fabric reinforcement protects foam against accidental damage from tools during installation and maintenance.

**B78-10420**

### **LOW-LEAKAGE LOW-TEMPERATURE VALVE**

W. S. WANG (Consolidated Controls Corp.)

Jan. 1979

**MSC-18087**

**Vol. 3, No. 3, p. 435**

Valve was originally designed to handle liquid nitrogen tetroxide and monomethyl hydrazine. It successfully survived leakage at temperature as low as minus 95.5 C. It seals tightly against cold fluids, even after thousands of opening-and-closing cycles.

**B78-10421**

### **HIGH-PRESSURE CRYOGENIC CYLINDER SEAL**

M. E. BURR (Rockwell Intern. Corp.)

Jan. 1979

**M-FS-19335**

**Vol. 3, No. 3, p. 436**

Triangular-cross-section Teflon ring seals against cryogenic fluid at temperature where standard wedge of U-rings fail. Ring can be mounted in groove in either piston or bore.

**B78-10422**

### **VACUUM LEADTHROUGH FOR HYDROGEN MASER**

D. A. NORRIS

Jan. 1979

**NPO-14148**

**Vol. 3, No. 3, p. 437**

Nonmagnetic leadthroughs are used in hydrogen maser for electrical interconnection into vacuum chamber. Seal uses uranium glass to form vacuum seal to tungsten rod. Epoxy resin seals glass-coated rod to aluminum body. Connector was subjected to temperature cycling between minus 65 degrees to 150 C, six to seven times over a sixteen hour period.

**B78-10423**

### **ELECTRIC AND HYBRID VEHICLES**

Innovator not given (Electric and Hybrid Vehicle Project Office of Lewis Research Center) Jan. 1979 See also NASA-TM-73756 (N78-18988)

**LEWIS-13077**

**Vol. 3, No. 3, p. 436**

Report characterizes state-of-the-art electric and hybrid (combined electric and heat engine) vehicles. Performance data for representative number of these vehicles were obtained from track and dynamometer tests. User experience information was obtained from fleet operators and individual owners of electric vehicles. Data on performance and physical characteristics of large number of vehicles were obtained from manufacturers and available literature.

**B78-10424**

### **LINES, BELLOWS, FLEXIBLE HOSES, AND FILTERS**

Innovator not given (Space Propulsion and Power Division of Lewis Research Center) Jan. 1979 See also NASA SP-8123 (N78-16089)

**LEWIS-13077**

**Vol. 3, No. 3, p. 438**

Monograph organizes and presents significant experience and knowledge accumulated by NASA in development and operational programs. It reviews and assesses current design practices and establishes guidance for achieving greater consistency in design, increased reliability in end product, and greater efficiency in design effort.

**B78-10557**

### **TWO-POSITION WAX-MOTOR ROTARY ACTUATOR**

W. C. STANGE

Mar. 1979

**GSFC-12521**

**Vol. 3, No. 4, p. 591**

Two position rotary actuator rotates shaft by precisely 180 deg and rotates it back on command. Mechanism consumes 11 watts of power and functions over wide range of temperatures under high vacuum for long unattended periods. Light weight device may be used to flip magnetometer for calibration in magnetic field.

**B78-10558**

### **AUTOMATIC BYPASS VALVE**

R. F. MAYO

Mar. 1979

**LANGLEY-12063**

**Vol. 3, No. 4, p. 592**

Modified pressure-regulator valve developed for arc powered wind tunnels allows automatic, accurate, and easily adjustable transfer of excess airflow.

**B78-10559**

### **LOW PARTIAL DISCHARGE VACUUM FEEDTHROUGH**

J. W. BENHAM (General Electric Co.) and S. R. PECK (General Electric Co.)

Mar. 1979

**GSFC-12347**

**Vol. 3, No. 4, p. 593**

Relatively discharge free vacuum feedthrough uses silver-plated copper conductor jacketed by carbon filled silicon semiconductor to reduce concentrated electric fields and minimize occurrence of partial discharge.

**B78-10560**

### **ADJUSTABLE GAS-FLOW RESTRICTOR**

J. J. BROWN (Rockwell Intern. Corp.) and A. CARNEVALLE (Rockwell Intern. Corp.)

Mar. 1979

**MSC-19486**

**Vol. 3, No. 4, p. 594**

Flow restrictor uses long narrow helical path between mating threads to effect simultaneous pressure and temperature reduction of flowing gases within short axial distance. Pressure drop can be adjusted simply by screwing or unscrewing threaded parts to increase or decrease flow path.

**B78-10561**

### **TRANSMITTING ROTARY MOTION AT AN ANGLE**

W. T. APPLEBERRY (Rockwell Intern. Corp.)

Mar. 1979

**MSC-19483**

**Vol. 3, No. 4, p. 594**

Transmission consisting of corrugated metal tube that can bend along its axis can transmit torques in range of 100 to 1000 pound-inches at corner angles as great as 180 deg. Possible uses include submerged mechanisms and food processing machinery where sealed drive line without contaminating lubricants is required.

**B78-10562**

### **COATING FOR HOT SLIDING SEALS**

J. STOCK (Fairchild Industries, Inc.)

Mar. 1979

**MSC-16529**

**Vol. 3, No. 4, p. 595**

Heat resistant paint is effective surface coating for sliding seals that must operate at elevated temperatures. Economical paint is easy to apply, offers minimal friction, and improves reliability of seals.

**B78-10563**

### **DRAG-PUMP ROTATING FILTER**

G. H. DAVIS (United Technologies, Inc.) and T. M. DOYLE (United Technologies, Inc.)

Mar. 1979

**MSC-16180**

**Vol. 3, No. 4, p. 596**

Rotating filter, incorporated in water separation section of fuel cell hydrogen pump separator, traps contaminants before they reach critical impeller/statorhousing interface.

**B78-10564**

### **COMPACT BYPASS-FLOW FILTER**



W. G. SWIFT (Parker Hannifin Corp.) and J. M. ULANOVSKY (Parker Hannifin Corp.)

Mar. 1979

**MSC-18311** Vol. 3, No. 4, p. 597

Annular filter consisting of stacked rings separates particulates from bypass fluid passing through it in radial direction without slowing down main flow across unimpeded flow of fluid through its center. Applications include fluidized bed reactors, equipment for catalyst operations, and water purification.

**B78-10565**

**REDUCING STICKINESS OF ELASTOMER VALVE SEALS**

T. V. BRASWELL (TRW, Inc.) and J. W. MARTIN (TRW, Inc.)

Mar. 1979

**LANGLEY-11778** Vol. 3, No. 4, p. 597

Special boiling and drying process removes approximately one half of extractable hydrocarbon tail present in peroxide cured elastomer of valve seals.

**B78-10566**

**METALLIC THERMAL SEAL**

J. BELLAVIA (Rockwell Intern. Corp.) and J. O. KANE (Rockwell Intern. Corp.)

Mar. 1979

**MSC-18135** Vol. 3, No. 4, p. 598

Thermal barrier, constructed of U-shaped metal strips and room temperature-vulcanized silicon rubber, prevents hot gas from escaping through gaps. In application metallic barrier could be used to prevent heat from escaping through gaps around door, windows, partitions, and similar structures.

**B78-10567**

**DURABLE NONSLIP STAINLESS-STEEL DRIVEBELTS**

H. BAHIMAN

Mar. 1979

**GSFC-12276; GSFC-12289** Vol. 3, No. 4, p. 599

Two toothed stainless-steel drive belt retains its strength and flexibility in extreme heat or cold, intense radiation, or under high loading. Belt does not stretch or slip and is particularly suited to machinery for which replacement is difficult or impossible.

**B78-10568**

**TWO (OR MORE) ROTARY OUTPUTS FROM ONE INPUT**

W. T. APPLEBERRY (Rockwell Intern. Corp.)

Mar. 1979

**MSC-19450** Vol. 3, No. 4, p. 600

Mechanical sequencing device produces cyclic rotations of two outputs from single cyclic rotary input. Device is useful in automatic assemble apparatus, in food-processing machinery, and as controller for sequentially operated valves.

**B78-10569**

**LOCALIZED COOLING OF ELECTRONIC COMPONENTS**

Innovator not given (Aerospace Div. of Honeywell, Inc.) Mar. 1979

**LANGLEY-11955** Vol. 3, No. 4, p. 601

Board-mounted electronic components are cooled quickly and conveniently for troubleshooting with aid of device that produces cold jet of dry oxygen. It can cool nonflat and hard-to-reach components.

**B78-10570**

**'BLIND' POSITION INDICATOR**

R. C. CRUZAN (Rockwell Intern. Corp.)

Mar. 1979

**MSC-16972** Vol. 3, No. 4, p. 602

Position-indicating instrument helps operator align parts without seeing them. Device is useful in industrial operations where parts must be blind-positioned accurately.

**B78-10571**

**FASTENER FOR THERMAL INSULATION BLANKETS**

J. D. COLE (Rockwell Intern. Corp.) and M. L. MARKE (Rockwell Intern. Corp.)

Mar. 1979

**MSC-18253** Vol. 3, No. 4, p. 603

Serrated-stem fastener, similar to those that hold wire harnesses, has been adapted to attach blankets to supporting structures. Easy installation and removal implemented.

**B78-10572**

**COMBINED HINGE AND LATCH**

W. T. APPLEBERRY (Rockwell Intern. Corp.)

Mar. 1979

**MSC-19602** Vol. 3, No. 4, p. 604

In door mechanism, hinge and latch are combined in single four-part assembly. Latch eliminates need for protruding hook, and can be modified to lock door in ninety degree position.

**B78-10573**

**GEAR-TOOTH FATIGUE-STRENGTH ESTIMATES**

W. BRINKLEY (McDonnell Douglas Corp.)

Mar. 1979

**MSC-18167** Vol. 3, No. 4, p. 605

Method helps to determine fatigue damage and safety margins for case-hardened gear teeth. It can help designers determine rapidly these important factors.

**B78-10574**

**RIGID 'SLING' FOR TOPHEAVY LOADS**

R. D. STEWART

Mar. 1979

**GSFC-12359** Vol. 3, No. 4, p. 605

Easy-to-use gantry safely lifts tophheavy loads. Gantry is designed for quick assembly and adjustment around payload.

**B78-10575**

**BEND-ABSORBING CLAMP**

J. R. ABBOTT (Rockwell Intern. Corp.) and B. VALENCIA, JR. (Rockwell Intern. Corp.)

Mar. 1979

**MSC-16971** Vol. 3, No. 4, p. 606

Compact, inexpensive clamp for flexible cables or rigid tubes absorbs vibrations and other motion. It accomodates wide range of dimensions, and saves space by eliminating pigtails or bellows commonly used to absorb linear movement or vibrations

**B78-10576**

**EXTENSION HANDLE FOR SPRAY CANS**

W. G. LUCAS (Boeing Co.)

Mar. 1979

**KSC-11083** Vol. 3, No. 4, p. 607

Tubing and trigger assembly directs aerosol spray into hard-to-reach areas.

**B78-10577**

**SAFE, DURABLE SOIL SAMPLER**

R. D. DURRANT (Lockheed Elec. Co.)

Mar. 1979

**MSC-18171** Vol. 3, No. 4, p. 607

Soil sampling tool protects user from injury and resists effects of weather and hard use. Penetrometer has uses in construction, surveying, geological research and similar applications.

**B78-10578**

**DYNAMIC BRAKING OF BIDIRECTIONAL MOTORS**

P. F. DEXTER

Mar. 1979

**ARC-11194** Vol. 3, No. 4, p. 608

Circuit controls switching of bidirectional motor with dynamic braking.

**B78-10579**

**WRENCH FOR THIN-WALLED CYLINDERS**

W. C. HEIER

Mar. 1979

**LANGLEY-12286** Vol. 3, No. 4, p. 609

Torquing wrench holds thin-wall cylinders gently yet firmly. No wrenching flats, slots, or holes need to be added to cylinder.

**B78-10580**

**STIRLING-ENGINE DESIGN MANUAL**

## 08 FABRICATION TECHNOLOGY

W. R. MARTINI (Univ. of Washington)  
Mar. 1979

**LEWIS-13098**

**Vol. 3, No. 4, p. 610**

Engine which offers high efficiency and low emissions is described. Fundamental operation, analytic tools for stimulation, design, evaluation, and optimization is offered.

## 08 FABRICATION TECHNOLOGY

**B78-10112**

**HIGH-TEMPERATURE BRAZING OF STAINLESS STEEL**

C. S. BEUYUKIAN (Rockwell Intern. Corp.), R. M. HEISMAN (Rockwell Intern. Corp.), and M. J. MITCHELL (Rockwell Intern. Corp.)

Jun. 1978 See also B78-10115; B78-10114; B78-10113

**MSC-19459**

**Vol. 3, No. 1, p. 121**

Prevention of iron contamination of platens is eliminated by placing alumina/silica ceramic-fiber blankets between platens and carbon-steel plate. Carbon-steel plates provide rigidity and improve heat transfer.

**B78-10113**

**FORM DIE AND GLIDE PLATES FOR VACUUM BRAZING**

C. S. BEUYUKIAN (Rockwell Intern. Corp.) and M. J. MITCHELL (Rockwell Intern. Corp.)

Jun. 1978 See also B78-10115; B78-10114; B78-10112

**MSC-16549**

**Vol. 3, No. 1, p. 122**

Die for fabricating steel retorts is made from commercial plywood with steel facing. Smooth-finished glide plates prevent partial bonding of plates to stainless-steel parts.

**B78-10114**

**INTERNAL GRID FOR RELEASE OF BRAZING RETORTS**

C. S. BEUYUKIAN (Rockwell Intern. Corp.) and M. J. MITCHELL (Rockwell Intern. Corp.)

Jun. 1978 See also B78-10115; B78-10113; B78-10112

**MSC-19472**

**Vol. 3, No. 1, p. 123**

Wire grid permits retorts to be opened more quickly after brazing. Grid also aids purging and evacuation, better control of vacuum in part area, and reduces thermocouple damage.

**B78-10115**

**VACUUM CONTROL FOR BRAZING STAINLESS STEEL**

C. S. BEUYUKIAN (Rockwell Intern. Corp.) and M. J. MITCHELL (Rockwell Intern. Corp.)

Jun. 1978 See also B78-10114; B78-10113; B78-10112

**MSC-19457**

**Vol. 3, No. 1, p. 124**

System controls outgassing, thus reducing vaporization of braze-alloy and release-agent components, and improving braze quality.

**B78-10116**

**PROCESS FABRICATES FLAT PANELS AT HIGH TEMPERATURES**

C. S. BEUYUKIAN (Rockwell Intern. Corp.), R. M. HEISMAN (Rockwell Intern. Corp.), and M. J. MITCHELL (Rockwell Intern. Corp.)

Jun. 1978

**MSC-16969**

**Vol. 3, No. 1, p. 125**

Panel contours are precisely recorded on compression grid for compensating machine operations.

**B78-10117**

**TWO BRAZE ALLOYS FOR THIN-WALL COMPONENTS**

A. BRENNAN (Rockwell Intern. Corp.) and R. D. MCKOWN (Rockwell Intern. Corp.)

Jun. 1978

**M-FS-19206**

**Vol. 3, No. 1, p. 126**

Alloys are ductile and are not subject to hydrogen or cryogenic embrittlement. During brazing operation, alloys demonstrate

excellent wetting, flow and gap-filling capacities, and resist oxidation and salt-spray corrosion. Alloys are producible as foils, tape, wire, and powder. They may be used to join stainless steels and nickel and cobalt high-temperature alloys.

**B78-10118**

**LASER WIRE STRIPPING**

R. M. HEISMAN (Rockwell Intern. Corp.), W. F. ICELAND (Rockwell Intern. Corp.), A. R. KEIR (Rockwell Intern. Corp.), L. A. SMALL (Rockwell Intern. Corp.), and F. R. YEARIAN (Rockwell Intern. Corp.)

Jun. 1978 See also NASA SP-5107

**MSC-18000**

**Vol. 3, No. 1, p. 126**

Bench-mounted and hand-held laser units cut insulation from wires without nipping or scraping conductor. Process eliminates quality control problems and is fast, clean, precise, and repeatable.

**B78-10119**

**CALCULATING WIRE-BUNDLE DIAMETER**

E. J. STRINGER (Rockwell Intern. Corp.)

Jun. 1978

**MSC-16378**

**Vol. 3, No. 1, p. 127**

Outside diameters of wire bundles are calculated rapidly and accurately using table of empirical factors (bundle factors).

**B78-10120**

**WIRE SELECTOR/CALCULATOR**

J. R. FUHRMAN (Rockwell Intern. Corp.)

Jun. 1978

**MSC-16632**

**Vol. 3, No. 1, p. 128**

Circular device contains five scales that rotate in relation to fixed scale. Device is contained in folding booklike enclosure, giving step-by-step instructions and presenting useful tables.

**B78-10121**

**BENCH-TOP SOLDERING AID FOR PC BOARDS**

N. R. MANTON (Rockwell Intern. Corp.) and R. A. SCHROFF (Rockwell Intern. Corp.)

Jun. 1978

**MSC-16274**

**Vol. 3, No. 1, p. 129**

Multiple-board rack allows technician to insert components into several boards, flip them all in single motion, and then systematically solder leads on reverse side. Two adjustable crossbars allow boards of any size up to 10 by 24 inches. Operator can rotate racks and adjust angle of boards from standing or sitting position.

**B78-10122**

**LASER BEAM ASSISTS IN PRECISION WELDING**

V. R. TOLMEI (Rockwell Intern. Corp.)

Jun. 1978

**M-FS-19319**

**Vol. 3, No. 1, p. 130**

Laser beam aiming method eliminates trial-and-error beam alignment in electron-beam welding.

**B78-10123**

**TOOL SIMPLIFIES WELD PREPARATION OF ALUMINUM**

H. C. LARUE and E. L. SHROPSHIRE

Jun. 1978

**MSC-16992**

**Vol. 3, No. 1, p. 130**

Chisel fits into standard riveting gun. Device has V-shaped cutting end, allowing for easy penetration of material and removal of cuttings.

**B78-10124**

**HIGH-VACUUM, LOW-TEMPERATURE BOND FOR SECOND-SURFACE MIRRORS**

D. MCKEOWN (Faraday Labs., Inc.) and G. SONNENSCHNEIN (Faraday Labs., Inc.)

Jun. 1978

**M-FS-23405**

**Vol. 3, No. 1, p. 131**

Indium solder reliably bonds second-surface mirrors to radiant coolers in cryogenic environments.

**B78-10125**

**INSPECTION OF ADHESIVE-BONDED RADIATORS**

M. W. REED (Vought Missiles and Space Co.)  
Jun. 1978

**MSC-18062** Vol. 3, No. 1, p. 131

Adhesive-bond thickness in honeycomb-sandwich radiators is verified by visual inspection. Markoff on flow tubes created during curing process is directly related to adhesive thickness.

**B78-10126**

**MATCH-MOLD PROCESS FOR FOAM INSULATION**

H. E. RUMENAPP (Rockwell Intern. Corp.), G. G. LISKAY (Rockwell Intern. Corp.), and D. S. WANG (Rockwell Intern. Corp.)  
Jun. 1978 See also B78-10128; B78-10127

**MSC-16631** Vol. 3, No. 1, p. 132

Process, using fast-setting putty-type thixotropic epoxy material, eliminates need for leakproof enclosures. Method reduces cure time from 15 to 4 hours. Epoxy masters are stronger and do not require special coating for storage. Manufacturers of form-fitted insulation or packaging forms will find this process to be of interest.

**B78-10127**

**VOID-FREE FOAM INSULATION**

G. G. LISKAY (Rockwell Intern. Corp.) and D. S. WANG (Rockwell Intern. Corp.)  
Jun. 1978 See also B78-10128; B78-10126

**MSC-16805** Vol. 3, No. 1, p. 133

Sectional casting method uses blocking piece for first pour, which limits pour height to 12 inches.

**B78-10128**

**HIGH-RISE FOAM-IN-PLACE PROCESS**

G. G. LISKAY (Rockwell Intern. Corp.)  
Jun. 1978 See also B78-10127; B78-10126

**MSC-16931** Vol. 3, No. 1, p. 133

Large polyurethane parts are molded by sequential pouring without waiting for foam to cure. Joints between pours and tops of parts are free of voids and need no trimming.

**B78-10129**

**RECLAIMING HYBRID INTEGRATED CIRCUITS**

G. EBEL (Singer Co.) and H. GROSSBARD (Singer Co.)  
Jun. 1978

**MSC-16463** Vol. 3, No. 1, p. 135

Reclamation method consists of opening very small hole in package and shaking out trapped particles. Procedure is performed in dry box through which an inert gas is flowing to insure no room air enters package. Acoustic transducer monitors sound of vibrating particles. Amplifier produces audio and oscilloscope output. Hole is sealed with heated solder form.

**B78-10130**

**BONDING KOVAR PINS TO AN ALUMINA SUBSTRATE**

G. D. BENNETT (Simmonds Precision, Instrument Systems Division)  
Jun. 1978

**MSC-16828** Vol. 3, No. 1, p. 135

Assemblies for cryogenic applications are shockproof and vibrationproof.

**B78-10131**

**'PC FABRICATION' FOR SILICON SOLAR-CELL ARRAYS**

J. A. AMICK (RCA)  
Jun. 1978

**NPO-13991** Vol. 3, No. 1, p. 136

Batch bonding number of solar cells to preconfigured printed-wiring board is inexpensive and reduces assembly and setup time of multi-element solar cell power units.

**B78-10132**

**CONTINUOUS PROCESS FABRICATES BATTERY PLAQUE**

M. J. TURCHAN (Tyco Labs., Inc.)  
Jun. 1978

**GSFC-12054** Vol. 3, No. 1, p. 137

Fast coating/drying/sintering line produces high-quality nickel plaque for nickel-cadmium cells, having uniform, reproducible characteristics and carefully controlled thickness.

**B78-10133**

**IMPROVED THERMAL-TILE BARRIER**

D. H. CADE (Rockwell Intern. Corp.), R. N. SIDRIC (Rockwell Intern. Corp.), and M. SURBAT (Rockwell Intern. Corp.)  
Jun. 1978

**MSC-16929** Vol. 3, No. 1, p. 138

Improved filler design, laser processing to seal ceramic fibers, and device for sliding barrier into tile gap improves thermal tile.

**B78-10134**

**TILE-BONDING TOOL**

C. C. HAYNIE (Rockwell Intern. Corp.) and J. W. HOLT (Rockwell Intern. Corp.)  
Jun. 1978

**KSC-11053** Vol. 3, No. 1, p. 139

Device applies uniform, constant, precise pressure to hold tiles in place during bonding. Tool consists of pressure bladders supported by adjustable pole. Pole can accommodate single or multiple bladders. Tiles can be flat or contoured.

**B78-10135**

**HIGH-TEMPERATURE WATERPROOFING FOR TILES**

E. B. BAHNSEN (Lockheed Missiles and Space Co.) and Y. D. IZU (Lockheed Missiles and Space Co.)  
Jun. 1978

**MSC-16773** Vol. 3, No. 1, p. 140

Vapor-deposited coating protects silica tiles against water vapor up to 800 degrees Fahrenheit. Degradation products formed do not affect optical properties of coating. Application method makes it particularly suitable for fragile components.

**B78-10136**

**SIMPLIFIED TOOLING FOR SPRAY MASKING**

B. J. DINBAR (Rockwell Intern. Corp.) and R. E. HAMMONS (Rockwell Intern. Corp.)  
Jun. 1978

**MSC-16927** Vol. 3, No. 1, p. 140

Tooling technique involves positioning tiles within acrylic plastic masking frames that attach magnetically to holding fixture. Plastics are 'magnetized' with adhesive magnetic-rubber strips. Technique is simpler and less expensive than conventional methods. L-shaped masks are easily cut and altered.

**B78-10137**

**LADLE FOR POURING HOT MELT**

E. P. RUPPE (Rockwell Intern. Corp.) and K. TERAMURA (Rockwell Intern. Corp.)  
Jun. 1978

**MSC-16974** Vol. 3, No. 1, p. 141

Device has two weld-attached stubs that include guide plates. One stub accepts handle horizontally; other accepts it at an angle. Pinlock secures handle to stub.

**B78-10138**

**'SPACE SLITTER' FOR FILM OR TAPE**

W. H. JOHNSON (Boeing Co.)  
Jun. 1978

**KSC-10894** Vol. 3, No. 1, p. 142

Device cuts film or tape into strips by guiding film in channel under cutting blades. Device is operated by lifting pressure bar to insert blades into film. Film is then pulled through blades. Cutter has potential uses in advertising, commercial art, and publishing fields.

**B78-10139**

**PORTABLE FLUORESCENT-DYE INSPECTION DEVICE**

F. E. SUGG (Rockwell Intern. Corp.)  
Jun. 1978

**M-FS-24019** Vol. 3, No. 1, p. 143

Hand-held device blocks ambient light from inspection area and can be used to examine sections of large objects without requiring objects to be moved or placed in darkroom. Bellows-type flexible shield has foam ends that seal surface to be inspected. Ultraviolet lamp and magnifier mounted in bellows permit localization of light. Rigid eyeshield hood allows in situ inspection.

## 08 FABRICATION TECHNOLOGY

**B78-10140**

### **HANDBOOK FOR ESTIMATING FABRICATION COSTS**

L. M. FREEMAN

Jun. 1978 See also NASA TM-X-73397 (N77-27248)

**M-FS-23795**

**Vol. 3, No. 1, p. 144**

Guide helps design engineers determine total cost of fabricating electronic equipment. It contains tables of 'factors' for determining costs associated with fabrication. 'Standards' section includes estimations of time required for procedures ranging from machining, to wiring, to printed-circuit board fabrication.

**B78-10141**

### **SCALE PARACHUTE FABRICATION**

D. BACCHUS and D. HENKE (Goodyear Aerospace Corp.)

Jun. 1978 See also NASA CR-120719 (N76-18055)

**M-FS-23139**

**Vol. 3, No. 1, p. 144**

Report describes highlights in developing six 12.5-percent scale drogue parachute models. Deployment bags are fabricated for each model.

**B78-10142**

### **CMOS BULK-METAL DESIGN HANDBOOK**

T. M. EDGE

Jun. 1978 See also NASA TM-78126 (N77-86193)

**M-FS-23856**

**Vol. 3, No. 1, p. 145**

User's guide describes techniques for generating precision mask artwork for complex CMOS integrated circuits, starting from logic diagram. Techniques are based on standard-cell approach. Guide also includes user guidelines for designing efficient CMOS arrays.

**B78-10143**

### **IMPROVED ELECTRON-BEAM WELDER**

R. A. SMOCK, R. A. TAYLOR, and W. A. WALL

Jun. 1978 See also NASA TM-X-73390 (N77-23491)

**M-FS-23772**

**Vol. 3, No. 1, p. 145**

Report describes comprehensive test-and-evaluation program designed to improve performance of 7.5 kW electron-beam welder. Report describes prototype and seventeen changes incorporated to improve performance.

**B78-10144**

### **PNEUMATIC SERVOMECHANISMS**

T. E. BAILEY (Martin Marietta Corp.) and G. M. JOSEPH (Martin Marietta Corp.)

Jun. 1978

**M-FS-23295**

**Vol. 3, No. 1, p. 146**

Dynamic analysis computer program analyzes pneumatic servomechanism and the system it controls. System and device to be modeled can contain up to twenty ullage chambers, twenty moving parts, and forty flow lines. Program is easily modified to model larger systems.

**B78-10282**

### **IMPROVED TRANSFORMER-WINDING METHOD**

W. T. MCILYMAN

Oct. 1978 See also B78-10283

**NPO-14243**

**Vol. 3, No. 2, p. 291**

Proposed technique using special bobbin and fixture to wind copper wire directly on core eliminates need core cut prior to assembly. Application of technique could result in production of quieter core with increased permeability and no localized heating.

**B78-10283**

### **BONDING CORE MATING SURFACES IMPROVES TRANSFORMER**

W. T. MCILYMAN

Oct. 1978 See also B78-10282

**NPO-13855**

**Vol. 3, No. 2, p. 292**

Modifications to assembly procedures for C-core transformers virtually eliminates changes in core end gaps due to temperature cycling during impregnation and potting stages, thus stabilizing magnetization properties of core.

**B78-10284**

### **FRICTION OF THICK LAMINATES**

G. E. DICKERSON

Oct. 1978

**LANGLEY-12010**

**Vol. 3, No. 2, p. 292**

Technique which improves fiber alignment and reduces void content of thick laminated structures is readily applicable to structures that contain sections such as ribs, channels, or bosses joined to thin stems of same material.

**B78-10285**

### **VOID-FREE BENDS IN LAMINATED STRUCTURES**

S. W. RICE (Vought Corp.), F. A. SCHWIND (Vought Corp.), and J. H. WILSON (Vought Corp.)

Oct. 1978

**MSC-16998**

**Vol. 3, No. 2, p. 293**

Layup technique involving repositioning of filler plies and redesigning of bleeder pressure pad reduces wrinkles, voids, pores, and other defects at sharp bends in laminated materials.

**B78-10286**

### **PROTECTIVE COATING FOR COPPER IN ALUMINUM HEAT EXCHANGERS**

R. AVAZIAN (Rockwell Intern. Corp.)

Oct. 1978

**M-FS-19334**

**Vol. 3, No. 2, p. 194**

Application of ultrathin layer of molybdenum disulfide coating to copper tubing permits utilization of tubing in cast-aluminum heat exchangers. Coating prevents formation of copper/aluminum eutectic, but does not impede heat transfer.

**B78-10287**

### **HIGH-STRENGTH BLIND RIVET**

L. R. JACKSON and A. H. TAYLOR (Vought Corp.)

Oct. 1978

**LANGLEY-12154**

**Vol. 3, No. 2, p. 294**

Method of upsetting blind head of rivets produces reliable, strong, pressure-tight fastenings.

**B78-10288**

### **SPECIAL WEAVE FOR INSULATING FABRICS**

J. A. FRYE (Rockwell Intern. Corp.) and R. M. PUSCH (HITCO)

Oct. 1978

**MSC-16380**

**Vol. 3, No. 2, p. 295**

Special weave forms tight fabric for high-alumina-content alumina/boria/silica fibers, without leading to expensive filament fracture during weaving process. Resultant abrasion-resistant material is superior to conventional insulating materials at elevated temperatures.

**B78-10289**

### **INSTALLING FIBER INSULATION IN TIGHT SPACES**

B. C. PATEL (Rockwell Intern. Corp.), D. S. WANG (Rockwell Intern. Corp.), and A. D. WARREN (Rockwell Intern. Corp.)

Oct. 1978

**MSC-16934**

**Vol. 3, No. 2, p. 296**

Two techniques using organic resin binders or thin clear-burning plastic film have been successfully used to simplify, and facilitate handling of aluminum/zirconia fiber batting as insulation material for high temperature seals.

**B78-10290**

### **VERIFYING THE FIT OF MATING CONTOURED SURFACES**

W. D. LEONARD, P. G. SANDEFUR, JR., and L. E. WILKINSON

Oct. 1978

**LANGLEY-11731**

**Vol. 3, No. 2, p. 297**

Simple inexpensive process uses commercially available compressible film to verify fit between mating metal surfaces within 0.08 mm to 0.13 mm.

**B78-10291**

### **GENTLE SUPPORT STANDS FOR FLUID-LINE MOCKUPS**

A. U. MILLET (Rockwell Intern. Corp.) and J. A. STEIN (Rockwell Intern. Corp.)

Oct. 1978

**MSC-16479**

**Vol. 3, No. 2, p. 298**

Screw clamp stand for fluid-line mockup support prevents distortion of tubing by color coded indicator lamps that acknowledge clamp contact.

**B78-10292****MICROCIRCUIT-CLEANING MACHINE**

W. W. ROBINSON (Sperry Rand Corp.) and J. C. WILLIAMSON (Sperry Rand Corp.)

Oct. 1978

**MSC-16060**

**Vol. 3, No. 2, p. 299**

Circuit shaker removes loose particles from hybrid microcircuit packages. Machine can reduce rejections from particle impact noise determination (PIND) tests to less than 7 percent. Shaker is easily constructed and could be manufactured for distribution as kit.

**B78-10293****SLURRY-POWDER SINTERING FURNACE**

J. BENE, J. F. JANSEN (Heliotech Corp.), and H. N. SEIGER (Heliotech Corp.)

Oct. 1978

**LANGLEY-11423; LANGLEY-11426** **Vol. 3, No. 2, p. 300**

Furnace design and filler material allow uniform sintered nickel plaque to be manufactured reliably.

**B78-10425****HIGH-GRADIENT CONTINUOUS-CASTING FURNACE**

C. M. SCHEUERMANN, M. C. FLEMINGS (MIT), M. A. NEFF (MIT), B. A. RICKINSON (MIT), and K. P. YOUNG (MIT)

Jan. 1979

**LEWIS-12934**

**Vol. 3, No. 3, p. 441**

High gradient allows rapid growth rates in directionally-solidified eutectic alloys. Furnace design permits cost reductions in directional solidification process through its increased solidification rates, which reduces melt/mold interaction. It produces structural engineering materials for any application requiring properties directionally-solidified eutectic materials.

**B78-10426****LATTICE PANELS WITH HIGH STRUCTURAL EFFICIENCY**

M. M. MIKULAS, JR. and M. D. RHODES

Jan. 1979 See also NASA-TM-X-72771 (N75-32160)

**LANGLEY-11898** **Vol. 3, No. 3, p. 442**

By orienting strips for maximum strength, composite lattice panel is nearly as strong as 'conventional' composite panels. They can be custom-tailored for various applications and also be useful in moderately loaded structures.

**B78-10427****LOW-COST GRAPHITE/EPOXY STRUCTURAL PANELS**

J. R. LAGER (Martin Marietta Corp.), D. PADILLA (Martin Marietta Corp.), W. F. THIEMET (Martin Marietta Corp.), and D. A. THOMAS (Martin Marietta Corp.)

Jan. 1979

**M-FS-23871**

**Vol. 3, No. 3, p. 443**

Manufacturing process precures components of composite panels prior to assembly. Process separately cures the graphite/epoxy skin, stiffener ribs, and stiffener grid. After curing, panels are assembled using special adhesive. With implementation of cost effective manufacturing techniques, uses of graphite-epoxy laminate panels may be found in other areas such as auto industry.

**B78-10428****WELDING FIXTURE FOR THIN METAL PARTS**

S. R. MCCLURE

Jan. 1979

**GSFC-12318**

**Vol. 3, No. 3, p. 444**

Approach of supporting entire part contour and applying uniform pressure to joints is useful in fabricating other lightweight metal structures. Fixture has three essential components: spring-finger collet that applies pressure to joint, compressing device for tightening collet, and mandrel that supports parts. Besides preserving contour of parts, mandrel also functions as heat sink.

**B78-10429****HOLDING FIXTURE FOR VARIABLE-CONTOUR PARTS**

C. C. HAYNIE (Rockwell Intern. Corp.), P. N. PACKER (Rockwell Intern. Corp.), and P. P. ZEBUS (Rockwell Intern. Corp.)

Jan. 1979

**MSC-16270**

**Vol. 3, No. 3, p. 445**

Array of vacuum cups on spindles holds parts for safe machining and other processings. Variable-contour part resting on fixture is held firmly enough for machining, coating, or other mechanical treatment.

**B78-10430****CONTROL OF DIELECTRIC FILM DEPOSITION**

E. C. GRAEBNER and T. J. RILEY

Jan. 1979

**LEWIS-13092**

**Vol. 3, No. 3, p. 446**

Airgap capacitor in deposition chamber is used to monitor deposition. Coating process is completely uniform over edges, points, and internal areas. Areas not requiring coating can be marked. Since deposition process is accomplished at or near room temperature, there is no risk of thermal damage to coated components. With control method, deposition material is fully utilized and no excess coating is necessary to insure protection of coated parts.

**B78-10431****REPAIRING PIN-FIN COLD PLATES**

E. P. RUPPE (Rockwell Intern. Corp.)

Jan. 1979

**MSC-16424**

**Vol. 3, No. 3, p. 447**

Inexpensive technique avoids high temperatures that deform thin stainless steel plates. Because repair disks have small diameters, repaired area can sustain greater loads than larger unsupported areas of faceplate.

**B78-10432****RIVETING-FORCE GAGE**

J. W. ROTTA, JR.

Jan. 1979

**NPO-13477**

**Vol. 3, No. 3, p. 448**

Gage monitors riveting forces applied when components are mounted on printed-circuit boards. Correct swaging pressures have been established for specific substrate materials such as phenolics and ceramics.

**B78-10433****REDUCING WELD PEAKING IN ALUMINUM**

E. BAYLESS, R. POORMAN, and J. SEXTON

Jan. 1979 See also NASA-TM-78176 (N78-25427)

**M-FS-23973**

**Vol. 3, No. 3, p. 448**

Excessive weld peaking can be corrected in heavy aluminum structures according to procedure. When peaking varies along weld joint, weld energy must be varied to compensate for nonuniformity.

**B78-10434****PROCESS FOR GROWING THIN POLISHED SILICON SHEETS**

C. C. RADICS

Jan. 1979

**NPO-14172**

**Vol. 3, No. 3, p. 449**

Single-crystal sheets pulled from polten silicon floating on refractory melt require no slicing or polishing. Possible materials are chlorides and fluorides of barium, calcium, and strontium. Refractory melt may be able to absorb impurities from silicon and thus obviate postgrowth purification.

**B78-10435****NO-WARP POTTED CIRCUITS**

W. W. ROBINSON (Rockwell Intern. Corp.)

Jan. 1979

**MSC-19729**

**Vol. 3, No. 3, p. 450**

Sponge inserts compensate for potting-compound expansion and relieve thermal stresses on circuit boards. Technique quality of production runs on PC boards intended for applications in environments less severe than those for aerospace equipment.

## 08 FABRICATION TECHNOLOGY

Pads reduce weight of modules because they weigh far less than potting compound they displace.

### **B78-10436 FASTENER FOR THIN FRAGILE MATERIALS**

S. SOKOL (Rockwell Intern. Corp.)

Jan. 1979

**MSC-18097**

**Vol. 3, No. 3, p. 451**

Two-piece fastener is ideal for securing thin delicate parts that might be damaged by conventional fasteners, such as rivets or upset collars. Strength of new fastener approaches that of riveted connection. Easily fabricated, fastener consists of plastic button and spring-steel collar. Parts have large contact area to distribute loads on delicate assemblies and low profile so that they fit into narrow spaces. Fastener is suitable for materials ranging in density from sheet metal to fabric sandwiches.

### **B78-10437 CERAMIC-TO-METAL VACUUM SEAL**

O. H. SACKERLOTZKY (Weston Instruments, Inc.)

Jan. 1979

**NPO-13803**

**Vol. 3, No. 3, p. 452**

Knife-edge sealing technique forms reliable, vacuum-tight bonds between materials having very different thermal-expansion characteristics. Seal is thin and flexible and absorb shear, hoop, and bonding stresses at joint so that seal remains vacuum tight.

### **B78-10438 IMPROVED METHOD OF SOLAR-CELL ASSEMBLY**

J. D. BRODER, A. F. FORESTIERI, and J. MANDELKORN

Jan. 1979 See also NASA-TM-X-52875 (N70-41903); NASA-TM-X-73674 (N77-26615); NASA-TM-X-73655 (N77-22610)

**LEWIS-12729**

**Vol. 3, No. 3, p. 452**

Method bonds solar-cell modules between rigid or flexible base and plastic protective cover. Method relies on using one of several commercially-available, transparent, silicone adhesives as bonding agent. Should it ever be necessary to repair or replace some part of assembly, it may be possible to remove cover without destroying package since adhesive remains flexible.

### **B78-10439 CIRCUIT-LEAD TRIMMING TEMPLATE**

K. OFARRELL (Sperry Rand Corp.) and E. WINN (Sperry Rand Corp.)

Jan. 1979

**MSC-16589**

**Vol. 3, No. 3, p. 453**

Template for use in trimming leads on production wiring boards is low-cost means for eliminating rejections for short leads and improving lead-strength uniformity. Template is simply unclad piece of printed-circuit board material that is drilled using same drill control tape used in making original production board. Revisions in component layout of board can therefore be made simultaneously in template.

### **B78-10440 BREATHER CLOTH FOR VACUUM CURING**

M. W. REED (Vought Corp.)

Jan. 1979

**MSC-18063**

**Vol. 3, No. 3, p. 454**

Finely-woven nylon cloth that has been treated with Teflon improves vacuum adhesive bonding of coatings to substrates. Cloth is placed over coating; entire assembly, including substrate, coating, and cloth, is placed in plastic vacuum bag for curing. Cloth allows coating to 'breathe' when bag is evacuated. Applications include bonding film coatings to solar concentrators and collectors.

### **B78-10441 PROCESSING HIGH-STRENGTH STEEL ALLOYS**

L. E. MCKNIGHT (Bertec Corp.)

Jan. 1979

**MSC-16172**

**Vol. 3, No. 3, p. 454**

Four-part report describes processing procedures for high-strength alloy steel suitable for use in pistons, piston rods, cylinder barrels, and other critical applications.

**B78-10581**

### **CONTROLLING THE GROWTH OF SILICON SHEETS**

T. F. CISZEK (IBM Corp.)

Mar. 1979

**NPO-14295**

**Vol. 3, No. 4, p. 613**

Automated systems regulates sheet width, thickness, and composition. Deviations from preset brightness levels create error signals that alter gas flow, crystal-pulling speed, and melt temperature to produce uniform single-crystal sheets.

**B78-10582**

### **AUTOMATED CONTROL OF CRYSTAL GROWTH**

A. HATCH (Mobile Tyco Solar Energy Corp.) and D. YATES (Mobile Tyco Solar Energy Corp.)

Mar. 1979

**NPO-14420**

**Vol. 3, No. 4, p. 614**

Optical sensors detect liquid/crystal-interface growth parameters. Technique enables automation by using cold-cathode-discharge sensors and linear imaging devices to determine process status and direct growth process.

**B78-10583**

### **APPLYING UNIFORM ADHESIVE COATINGS**

D. S. WANG (Rockwell Intern. Corp.)

Mar. 1979

**MSC-19462**

**Vol. 3, No. 4, p. 615**

Removable overlay keeps thickness variations small, saving material and application time. In comparative tests against roller, brush, and spray application, thickness variations in the conventional techniques were at least three times greater.

**B78-10584**

### **ELECTROPLATED 'COLD PATCH' FOR CRITICAL PARTS**

H. A. TRIPP (Rockwell Intern. Corp.)

Mar. 1979

**M-FS-19401**

**Vol. 3, No. 4, p. 616**

Cracks in metal parts are filled by electrodeposition in plating tank that conforms to part to be repaired. Principle is applicable to repair of cracks in components of chemical reactors and other critical structures.

**B78-10585**

### **ACCELERATED HYBRID-CIRCUIT PRODUCTION**

J. E. BERG (Sperry Rand Corp.) and M. A. DASSELE (Sperry Rand Corp.)

Mar. 1979

**MSC-18272**

**Vol. 3, No. 4, p. 617**

Modified die-bonding machine speeds up hybrid-circuit production. Utilizing two pedestals, one for die tray and another for substrate tray, increased production and decreased error-margin are possible.

**B78-10586**

### **DETECTING OVERPENETRATION OF ELECTRON-BEAM WELDS**

D. I. MACFARLANE (Rockwell Intern. Corp.) and F. D. YOUNG (Rockwell Intern. Corp.)

Mar. 1979

**M-FS-19396**

**Vol. 3, No. 4, p. 618**

Gold plate beneath weldment reveals areas of excess penetration during X-ray inspection. Technique is applicable to critical electron-beam welds, such as those in gas turbines and pressure vessels.

**B78-10587**

### **BRAZING DISSIMILAR ALUMINUM ALLOYS**

H. DALALIAN (Singer Co.)

Mar. 1979

**MSC-16340**

**Vol. 3, No. 4, p. 619**

Dip-brazing process joins aluminum castings to aluminum sheet made from different aluminum alloy. Process includes careful cleaning, surface preparation, and temperature control. It causes minimum distortion of parts.

**B78-10588**

### **CONTOURING PILE-BRUSH SEALS**

L. B. NORWOOD (Rockwell Intern. Corp.)

Mar. 1979

**MSC-16231**

**Vol. 3, No. 4, p. 588**

Variety of shapes are produced by simple flat machining. Freeze-cut method is cost-efficient by eliminating necessity to cut brushes individually.

**B78-10589**

**EASILY INSTALLED INSULATION FOR STEAMFITTINGS**

G. OWENS and J. E. POUZAR

Mar. 1979

**MSC-18277**

**Vol. 3, No. 4, p. 620**

Insulating blanket trimmed by hook-and-loop fasteners adds safety and prevents heat loss. For maintenance or adjustments, borders are quickly unfastened and fabric slipped off.

**B78-10590**

**ALL-ION-IMPLANTATION PROCESS FOR INTEGRATED CIRCUITS**

D. S. WOO (RCA Corp.)

Mar. 1979

**M-FS-23995**

**Vol. 3, No. 4, p. 621**

Simpler than diffusion fabrication, ion bombardment produces complementary-metal-oxide-semiconductor / silicon-on-sapphire (CMOS/SOS) circuits that are one-third faster. Ion implantation simplifies the integrated circuit fabrication procedure and produces circuits with uniform characteristics.

**B78-10591**

**PREPARING THIN ALUMINUM FILMS FOR ADHESIVE BONDING**

T. SMITH (Rockwell Intern. Corp.)

Mar. 1979

**NPO-14357**

**Vol. 3, No. 4, p. 621**

Carbonate pretreatment produces highly bondable surface without harming film. Treatment is useful in developing low-cost mirrors and solar concentrators fabricated from metal-coated plastic films. Treatment should cost no more than standard degreasing and rinsing procedures.

**B78-10592**

**SEALING MICROCIRCUITS WITH ADHESIVES**

J. J. LICARI (Rockwell Intern. Corp.) and K. L. PERKINS (Rockwell Intern. Corp.)

Mar. 1979 See also NASA-CR-150420 (N77-33349)

**M-FS-23869**

**Vol. 3, No. 4, p. 622**

Report describes study of adhesive-sealed packages for hybrid microcircuits. Ten commercially available adhesives were used to seal metal and ceramic packages and were tested for moisture resistance at high humidity.

## 09 MATHEMATICS AND INFORMATION SCIENCES

**B78-10145**

**VERIFICATION OF REDUNDANCY MANAGEMENT DESIGN**

H. C. GELDERLOOS (Honeywell, Inc.) and D. V. WILSON (Honeywell, Inc.)

Jun. 1978

**MSC-16713**

**Vol. 3, No. 1, p. 149**

Statistical method checks designs by simulating system operating conditions and adding error factors. Method has potential applicability to commercial and industrial situations where redundancy management system is used to detect and isolate failed components.

**B78-10146**

**MODEL FOR REDUNDANT-SENSOR SIGNAL ERRORS**

D. J. SOWADA (Honeywell, Inc.)

Jun. 1978

**MSC-16715**

**Vol. 3, No. 1, p. 149**

Report describes application of order statistics to analysis of failure modes in redundant systems. Report provides detailed mathematical discussion of approach, accompanied by graphs and equations. Techniques are relevant to process that demand high reliability, such as manufacture of dangerous chemicals. It also includes discussion of quad-redundant system.

**B78-10147**

**BODY-FITTED COORDINATES SYSTEMS TRANSFORMATIONS**

C. W. MASTIN (Mississippi State Univ.), F. C. THAMES (Mississippi State Univ.), and J. F. THOMPSON (Mississippi State Univ.)

Jun. 1978

**LANGLEY-12307**

**Vol. 3, No. 1, p. 150**

Two computer programs generate two-dimensional body-fitted coordinate systems and coordinate transformation. Programs are useful in fields requiring accurate numerical representation of boundary conditions and accurate numerical solutions of partial differential equations.

**B78-10294**

**DETECTING AND CORRECTING BIT ERRORS ON MAGNETIC TAPE**

M. PERLMAN

Oct. 1978

**NPO-13842**

**Vol. 3, No. 2, p. 303**

Procedure detects and corrects errors in data held for long term storage on magnetic tape.

**B78-10295**

**FABRICATION OF SEA-FLOOR MODELS**

G. L. HALE, C. E. LEVOE, and R. E. RENNER

Oct. 1978

**NPO-13554**

**Vol. 3, No. 2, p. 303**

Sea-floor models are fabricated simply and inexpensively by utilizing milling machine programmed with data tapes from ocean sounding surveys, and cement vermiculite mixture.

**B78-10296**

**MARSHALL SYSTEM FOR AEROSPACE SIMULATION**

H. H. TRAUBOTH, T. L. BALENTINE (Computer Sci. Corp.), W. L. MCCOLLUM (Computer Sci. Corp.), R. SEVIGNY (Computer Sci. Corp.), and A. J. VENTRE

Oct. 1978

**M-FS-22672**

**Vol. 3, No. 2, p. 305**

Software system allow facilitates quick and relatively easy simulations of physical systems on digital computers. Language is simple and flexible, and can be used by people who have little or no familiarity with computer programming.

**B78-10442**

**PROCESSING MULTISPECTRAL SIGNALS FROM A DISCRETE-SENSOR ARRAY**

J. B. WELLMAN

Jan. 1979

**NPO-14211**

**Vol. 3, No. 3, p. 457**

Technique encoding and decoding color-image signals from array of discrete sensors can simplify fabrication of remote-sensing imaging system. Imaging system projects output on charge-coupled-device array. Computerized matrix decoding scheme decodes image.

**B78-10443**

**ALGORITHMS FOR LINEAR-SYSTEMS CONTROL**

E. S. ARMSTRONG

Jan. 1979

**LANGLEY-12313**

**Vol. 3, No. 3, p. 458**

Control-theory design package aids design of linear-quadratic-Gaussian (LOG) controllers and optimal filters. It is applicable to systems that can be modeled by linear time-invariant differential or difference equations.

**B78-10444**

**MULTIPURPOSE SYSTEM SIMULATOR**

## 09 MATHEMATICS AND INFORMATION SCIENCES

C. A. PACKARD

Jan. 1979

**GSFC-12333**

Vol. 3, No. 3, p. 459

Multipurpose System Simulator (MPSS) evaluates relative performance of competitive computer systems and isolates areas for enhancement in existing or proposed systems. Model can simulate multiple central-processing-unit (CPU) interactive systems.

**B78-10445**

**PLOTTING SHEAR-FLOW FORCES**

T. FURUIKE and J. C. LONG

Jan. 1979

**MSC-18013**

Vol. 3, No. 3, p. 459

Structural analysts can use computer program to study shear-flow and in-plane forces characteristic of quadrilateral panels subjected to different loading conditions. Digital outputs are presented for engineers and management, with various options to allow bulk of data to be analyzed quickly.

**B78-10446**

**SPARES-OPTIMIZED MODEL**

A. W. CAIN (Rockwell Intern. Corp.) and R. E. PAULIN (Rockwell Intern. Corp.)

Jan. 1979

**MSC-18015**

Vol. 3, No. 3, p. 459

Computerized spares optimization for Space Shuttle Project comprises analytical process for developing spares quantification and budget forecasts. Model, which assesses risk associated with recommended spares quantities, is economical way to determine best mix of large number of spare types.

**B78-10447**

**A PARAMETER-ESTIMATION SUBROUTINE PACKAGE**

G. BIERMAN and M. W. NEAD

Jan. 1979

**NPO-14263**

Vol. 3, No. 3, p. 460

Estimation subroutine package comprises fast, efficient, and simple least-squares data-processing algorithms for use in orbit determination and related analyses. Very reliable and general algorithms have been documented. Package contains collection of streamlined subroutines that can be used to solve large variety of parameter-estimation and filtering problems. Special routines are included for problems with colored process noise and covariance (factor) mapping.

**B78-10593**

**COMPUTATION OF SPARE PARTS REQUIREMENTS**

M. A. MEZZACAPPA (Rockwell Intern. Corp.)

Mar. 1979

**MSC-16872**

Vol. 3, No. 4, p. 625

Statistical analysis determines probability of failure for N-1 spares. Analysis can help reduce downtime in industrial processes by determining number of spare parts that must be stockpiled. Analysis can also be inverted to decide if number of spares on hand is sufficient for lifetime needs of system.

**B78-10594**

**RESIZING ALGORITHM FOR LOADED STRUCTURES**

H. M. ADELMAN and R. NARAYANASWAMI (ODU Res. Foundation)

Mar. 1979 See also NASA-TM-X-72816 (N76-18530)

**LANGLEY-12064**

Vol. 3, No. 4, p. 625

Algorithm for resizing structural members subjected to combined thermal and mechanical loading is discussed.

**B78-10595**

**PREDICTING CROP PRODUCTION FROM SATELLITE DATA**

J. E. COLWELL (Environmental Res. Inst. of Mich.), R. F. NALEPKA (Environmental Res. Inst. of Mich.), and D. T. RICE

Mar. 1979

**GSFC-12379**

Vol. 3, No. 4, p. 626

Crop area and yield for winter wheat is found by analysis of LANDSAT pictures. Correlation between measure and yield is established from measurements on known wheatfields with known yields.

**B78-10596**

**REPRESENTATION OF MULTIVALUED LOGIC FUNCTIONS**

B. BENJAUTHRIT and I. S. REED (Southern California Univ.)

Mar. 1979

**NPO-13760**

Vol. 3, No. 4, p. 627

Systematic method for representing multivariate finite Galois field functions can simplify synthesis of multivalued logic elements.

**B78-10597**

**PLOTTING MAX/MIN DATA ENVELOPES**

T. FURUIKE (Rockwell Intern. Corp.) and J. C. LONG (Rockwell Intern. Corp.)

Mar. 1979

**MSC-18016**

Vol. 3, No. 4, p. 627

Study of maximum and minimum load distributions along structural section is aided by visual display of load distribution data. Maximum/minimum envelope plot program plots these envelopes of the stresses and shear loads at selected points in beam modeled by series of finite elements. Digital output for engineers and management is presented for quick analysis and understanding.

**B78-10598**

**GRAPHICS PROGRAM FOR CHARTS**

R. C. HENDRICKS and R. J. TRIVISONNO

Mar. 1979

**LEWIS-12811**

Vol. 3, No. 4, p. 628

GASLOT program is reliable, economical, and easy-to-use method of producing variety of thermophysical-property charts.

**B78-10599**

**PRICE AND COST ESTIMATION**

R. D. STEWART

Mar. 1979

**M-FS-23812**

Vol. 3, No. 4, p. 628

Price and Cost Estimating Program (PACE II) was developed to prepare man-hour and material cost estimates. Versatile and flexible tool significantly reduces computation time and errors and reduces typing and reproduction time involved in preparation of cost estimates.

**B78-10600**

**PROCESSOR FOR THE UNIVAC 1100 SERIES**

F. H. BRACHER, R. E. HOLZMAN, D. I. LEWIS, and R. C. TAUSWORTHE

Mar. 1979

**NPO-13469**

Vol. 3, No. 4, p. 629

MBASIC, advanced version of BASIC, is high-level interactive computer language designed to minimize time required for user to program task for computer execution. Language usually results in shorter and simpler programs that are easier to write and understand.

**B78-10601**

**POSTPROCESSING CLASSIFICATION IMAGES**

E. P. KAN (Lockheed Elec. Co. Inc.)

Mar. 1979

**MSC-18238**

Vol. 3, No. 4, p. 629

Program cleans up remote-sensing maps. It can be used with existing image-processing software. Remapped images closely resemble familiar resource information maps and can replace or supplement classification images not postprocessed by this program.



## Subject Index

The title of each Tech Brief is listed under several selected subject headings to provide the user with a variety of approaches in his search for specific information. The Tech Brief number, e.g., B78-10240, is located under and to the right of the title and is followed by a two-digit number, e.g., 05, which designates the subject category in which the entire entry can be found.

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MSC-16908 B78-10009 01

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Sealing microcircuits with adhesives  
M-FS-23869 B78-10592 08

**ADRENOCORTICOTROPIN (ACTH)**

Boosting production yield of biomedical peptides  
NPO-14142 878-10240 05

**ADSORPTION**

NO<sub>2</sub> measurement by  
chemiluminescence  
LANGLEY-11378 878-10386 06

**AERATION**

Free-air content in fluid systems  
MSC-16703 878-10251 06  
Deaerating high-viscosity silicon rubber  
MSC-16694 878-10514 04

**AERODYNAMIC CHARACTERISTICS**

Aerodynamic design lowers truck fuel consumption  
FRC-11015 878-10069 06

**AERODYNAMIC CONFIGURATIONS**

Nacelle incremental drag  
LEWIS-12786 878-10400 06

**AERODYNAMIC DRAG**

Aerodynamic design lowers truck fuel consumption  
FRC-11015 878-10069 06  
Improved electron-beam probe for hypersonic flows  
NPO-13793 878-10254 06

**AERODYNAMIC HEATING**

Tumbling-vehicle entry heating  
M-FS-23712 878-10555 06

**AERODYNAMIC LOADS**

Stability characteristics of elastic airplane  
ARC-11144 878-10092 06

**AERODYNAMIC NOISE**

Noise calculation on the basis of vortex flow models  
LANGLEY-12271 878-10078 06

**AERODYNAMIC STABILITY**

Stability characteristics of elastic airplane  
ARC-11144 878-10092 06  
Detection of boundary-layer transitions in wind tunnels  
LANGLEY-12261 878-10255 06

**AERODYNAMICS**

WAKE and WASH  
LANGLEY-12262 878-10093 06  
Wing aerodynamics under blowing jets  
LANGLEY-12256 878-10401 06  
High-sampling-rate pressure transducer has in situ calibration  
LANGLEY-12230 878-10536 06  
Potential flows in propulsion system inlets  
LEWIS-13010 878-10553 06

**AEROELASTICITY**

Stability characteristics of elastic airplane  
ARC-11144 878-10092 06

**AEROSOLS**

Extension handle for spray cans  
KSC-11083 878-10576 07

**AIR**

Free-air content in fluid systems  
MSC-16703 878-10251 06

**AIR CONDITIONING**

Hot-air flat-plate solar collector-design package  
M-FS-23941 878-10335 03  
Refrigerant leak detector  
MSC-18214 878-10551 06

**AIR CONDITIONING EQUIPMENT**

Application of solar energy to air-conditioning  
M-FS-23913 878-10215 03

**AIR FLOW**

Automatic bypass valve  
LANGLEY-12063 878-10558 07

**AIR LOCKS**

Metallic thermal seal  
MSC-18135 878-10566 07

**AIR POLLUTION**

Microbial desulfurization of coal  
NPO-14227 878-10038 04  
Automatic gain-balancing circuit  
LANGLEY-12074 878-10297 01  
Coal desulfurization with iron pentacarbonyl  
NPO-14272 878-10342 04  
Economical synthesis of potassium superoxide  
ARC-10992 878-10353 04  
Electric and hybrid vehicles  
LEWIS-13077 878-10423 07

**AIR PURIFICATION**

Modified chemiluminescent NO analyzer accurately measures NOX  
LEWIS-12850 878-10047 04  
Corona-discharge air-purification system  
ARC-10975 878-10350 04  
Economical synthesis of potassium superoxide  
ARC-10992 878-10353 04

**AIR QUALITY**

Automated syringe sampler  
LANGLEY-12308 878-10374 05

**AIR SAMPLING**

Simple air-piston gas-sampling system  
LEWIS-12922 878-10110 07

**AIR TRAFFIC CONTROL**

Air-traffic surveillance systems  
NPO-14173 878-10313 02

**AIRCRAFT COMPARTMENTS**

Airframe design for reducing cabin noise  
LANGLEY-12097 878-10257 06

**AIRCRAFT CONFIGURATIONS**

Potential flows in propulsion system inlets  
LEWIS-13010 878-10553 06

**AIRCRAFT DESIGN**

Airframe design for reducing cabin noise  
LANGLEY-12097 878-10257 06

**AIRCRAFT ENGINES**

Nacelle incremental drag  
LEWIS-12786 878-10400 06  
Real-time instrument averages 100 data sets  
LEWIS-13093 878-10534 06

**AIRCRAFT EQUIPMENT**

Combination force and angular-deflection indicator  
MSC-16155 878-10070 06

**AIRCRAFT FUELS**

Coal liquefaction to increase jet fuel production  
LANGLEY-12038 878-10343 04

**AIRCRAFT GUIDANCE**

Optical gyroscope  
NPO-14258 878-10176 03  
Air-traffic surveillance systems  
NPO-14173 878-10313 02

**AIRCRAFT INSTRUMENTS**

Optical gyroscope  
NPO-14258 878-10176 03  
Shock-swallowing air sensor  
FRC-10107 878-10537 06

**AIRCRAFT NOISE**

Airframe design for reducing cabin noise  
LANGLEY-12097 878-10257 06

**AIRCRAFT SAFETY**

Fire-retardant foams  
MSC-16222 878-10053 04  
Air-traffic surveillance systems  
NPO-14173 878-10313 02  
Heat resistant nontoxic laminate  
ARC-11040 878-10356 04

**AIRCRAFT STABILITY**

Stability characteristics of elastic airplane  
ARC-11144 878-10092 06

**AIRCRAFT STRUCTURES**

Wing aerodynamics under blowing jets  
LANGLEY-12256 878-10401 06

**AIRFRAME MATERIALS**

Heat resistant nontoxic laminate  
ARC-11040 878-10356 04

**AIRFRAMES**

Airframe design for reducing cabin noise  
LANGLEY-12097 878-10257 06

**AIRSPEED**

WAKE and WASH  
LANGLEY-12262 878-10093 06  
Shock-swallowing air sensor  
FRC-10107 878-10537 06

**ALGORITHMS**

Bit-synchronizer lock detector  
MSC-16744 878-10164 02  
Algorithms for linear-systems control  
LANGLEY-12313 878-10443 09  
A parameter-estimation subroutine package  
NPO-14263 878-10447 09

**ALIGNMENT**

Housing protects laser in vacuum  
GSFC-12241 878-10028 03  
Fluorescent paint simplifies laser-beam alignment  
LEWIS-12571 878-10030 03  
Laser beam assists in precision welding  
M-FS-19319 878-10122 08  
Ruby c-axis alignment system  
NPO-14252 878-10379 06  
Quick-connect threaded attachment joint  
LANGLEY-12232 878-10414 07  
Reducing weld peaking in aluminum  
M-FS-23973 878-10433 08  
'Blind' position indicator  
MSC-16972 878-10570 07

**ALKALI METALS**

Economical synthesis of potassium superoxide  
ARC-10992 878-10353 04

**ALLOYS**

Interactive data-processing system for metallurgy  
M-FS-23774 878-10217 04  
Embrittlement proof nickel-alloy bellows  
M-FS-19331 878-10349 04  
High-gradient continuous-casting furnace  
LEWIS-12934 878-10425 08

**ALUMINUM**

Tool simplifies weld preparation of aluminum  
MSC-16992 878-10123 08  
Reducing weld peaking in aluminum  
M-FS-23973 878-10433 08

**ALUMINUM ALLOYS**

Brazed boron-silicon carbide/aluminum structural panels  
LANGLEY-12244 878-10221 04  
High-gradient continuous-casting furnace  
LEWIS-12934 878-10425 08

- Absorptive coating for aluminum solar panels  
M-FS-25033 878-10507 04
- Brazing dissimilar aluminum alloys  
MSC-16340 878-10587 08
- ALUMINUM COATINGS**  
Measurement of subcoat thickness by characteristic x-rays  
MSC-16718 878-10505 04
- ALUMINUM OXIDES**  
Bonding Kovar pins to an alumina substrate  
MSC-16828 878-10130 08
- AMINES**  
High-pressure liquid chromatography of aromatic amines  
LANGLEY-12163 878-10515 04
- Porous bead packings for gas chromatography  
ARC-11222 878-10518 04
- AMMETERS**  
Helicopter position stabilizing system  
LANGLEY-11670 878-10256 06
- AMMONIA**  
Compatibility of Au-Cu-Ni braze alloy with NH<sub>3</sub>  
MSC-16864 878-10219 04
- Positively charged membrane for urea dialysis  
NPO-14101 878-10241 05
- AMPLITUDE MODULATION**  
Direct-reading group-delay measurement  
NPO-13909 878-10156 01
- ANALGESIA**  
Antihistamines reduce ulceration produced by indomethacin  
ARC-11118 878-10366 05
- ANALOG CIRCUITS**  
Symmetric voltage-controlled variable resistance  
MSC-16685 878-10148 01
- ANALOG TO DIGITAL CONVERTERS**  
Fast differential analog-to-digital conversion  
LEWIS-12909 878-10149 01
- Automatic acquisition and ranging system  
NPO-13982 878-10312 02
- ANALYZERS**  
Modified chemiluminescent NO analyzer accurately measures NOX  
LEWIS-12850 878-10047 04
- Fuseholders allow fast system checkout  
MSC-16856 878-10088 06
- Low-background trace-gas detector  
NPO-13683 878-10168 03
- Monitoring systems for community water supplies  
MSC-16778 878-10233 05
- Automatic gain-balancing circuit  
LANGLEY-12074 878-10297 01
- ANGLES (GEOMETRY)**  
Combination force and angular-deflection indicator  
MSC-16155 878-10070 06
- ANIMALS**  
Retainer for laboratory animals  
LANGLEY-12353 878-10371 05
- ANISOTROPIC PLATES**  
Analysis of cracked orthotropic sheets  
LANGLEY-12288 878-10405 06
- ANNULAR FLOW**  
Flow velocities and streamlines  
LEWIS-12966 878-10094 06
- ANTENNA ARRAYS**  
Control of small phased-array antennas  
MSC-14938 878-10166 02
- Efficient rectifying antenna  
NPO-13884 878-10471 02
- ANTENNA COMPONENTS**  
Microstrip backfire antenna  
LANGLEY-12172 878-10019 02
- Optimizing multislot feeds for reflecting antennas  
NPO-14064 878-10314 02
- ANTENNA DESIGN**  
Microstrip backfire antenna  
LANGLEY-12172 878-10019 02
- Optimizing multislot feeds for reflecting antennas  
NPO-14064 878-10314 02
- Compact antenna has symmetrical radiation pattern  
ARC-11189 878-10473 02
- ANTENNA FEEDS**  
Microstrip backfire antenna  
LANGLEY-12172 878-10019 02
- Optimizing multislot feeds for reflecting antennas  
NPO-14064 878-10314 02
- ANTENNA RADIATION PATTERNS**  
Optimizing multislot feeds for reflecting antennas  
NPO-14064 878-10314 02
- ANTENNAS**  
Microstrip backfire antenna  
LANGLEY-12172 878-10019 02
- Optimizing multislot feeds for reflecting antennas  
NPO-14064 878-10314 02
- More efficient microwave-power transmission  
NPO-13885 878-10466 02
- Lightweight conical antenna reflector  
NPO-13552 878-10472 02
- ANTIBODIES**  
Fluorescent microspheres  
NPO-13946 878-10068 05
- ANTIFRICTION BEARINGS**  
Improved gas thrust bearings  
LEWIS-12569 878-10413 07
- ANTI-HISTAMINICS**  
Antihistamines reduce ulceration produced by indomethacin  
ARC-11118 878-10366 05
- ANTIINFECTIVES AND ANTIBACTERIALS**  
Antihistamines reduce ulceration produced by indomethacin  
ARC-11118 878-10366 05
- ANTIREFLECTION COATINGS**  
Abrasion-resistant antireflective coating for polycarbonate  
ARC-11047 878-10054 04
- Natural-oxide solar-collector coatings  
M-FS-23518 878-10326 03
- Absorptive coating for aluminum solar panels  
M-FS-25033 878-10507 04
- APPROXIMATION**  
Fast differential analog-to-digital conversion  
LEWIS-12909 878-10149 01
- ARC DISCHARGES**  
Arc detector uses fiber optics  
NPO-13377 878-10449 01
- ARC GENERATORS**  
Portable spark-gap arc generator  
LEWIS-12886 878-10008 01
- ARGON**  
Vacuum control for brazing stainless steel  
MSC-19457 878-10115 08
- ARGON LASERS**  
Fluorescent paint simplifies laser-beam alignment  
LEWIS-12571 878-10030 03
- ARM (ANATOMY)**  
Human arm may act as antenna  
ARC-11195 878-10161 02
- ARRAYS**  
Phase-shift array, arbitrary and continuous through 360 deg  
LANGLEY-12272 878-10308 01
- ARTIFICIAL INTELLIGENCE**  
Self-navigating robot  
NPO-14190 878-10026 02
- ASSAYING**  
Rapid measurement of bacteria in water  
GSFC-12158 878-10232 05
- ASSEMBLING**  
High-vacuum, low-temperature bond for second-surface mirrors  
M-FS-23405 878-10124 08
- Automated solar-cell-array assembly machine  
NPO-13652 878-10186 03
- Bonding core mating surfaces improves transformer  
NPO-13855 878-10283 08
- Reducing weld peaking in aluminum  
M-FS-23973 878-10433 08
- Improved method of solar-cell assembly  
LEWIS-12729 878-10438 08
- Accelerated hybrid-circuit production  
MSC-18272 878-10585 08
- Brazing dissimilar aluminum alloys  
MSC-16340 878-10587 08
- ATMOSPHERIC HEAT BUDGET**  
Estimating regional heat flux from scanning radiometer data  
LANGLEY-12158 878-10329 03
- ATMOSPHERIC PRESSURE**  
Housing protects laser in vacuum  
GSFC-12241 878-10028 03
- ATTENUATORS**  
S-Band complex-weight module for adaptive processing  
LANGLEY-12197 878-10005 01
- Pulse-width-modulated attenuator for AGC  
NPO-14127 878-10459 01
- ATTITUDE CONTROL**  
Solar-electric geocentric transfer  
LEWIS-12939 878-10403 06
- AUDIO EQUIPMENT**  
Automatic circuit interrupter  
MSC-16697 878-10300 01
- Portable data system  
ARC-11136 878-10316 02
- AUDITORY PERCEPTION**  
Implantable digital hearing aid  
KSC-11009 878-10373 05
- AUSTENITIC STAINLESS STEELS**  
Low-chromium stainless steels  
LEWIS-12543 878-10046 04
- AUTOMATIC CONTROL**  
Improved servocontrol system  
M-FS-19358 878-10150 01
- Automated controller for liquid-cooled garments  
MSC-18055 878-10365 05
- Modulation improves electro-optic object detector  
M-FS-23776 878-10380 06

Automated temperature-cycling apparatus  
 LANGLEY-12310 B78-10391 06  
 Detecting servo failures with software  
 FRC-11003 B78-10396 06  
 Controlling the growth of silicon sheets  
 NPO-14295 B78-10581 08

**AUTOMATIC CONTROL VALVES**  
 Magnetostrictive valve  
 NPO-14235 B78-10104 07

**AUTOMATIC FREQUENCY CONTROL**  
 Multichannel VCO needs only one reference  
 MSC-18225 B78-10448 01

**AUTOMATIC GAIN CONTROL**  
 Improved servocontrol system  
 M-FS-19358 B78-10150 01  
 Pulse-width-modulated attenuator for AGC  
 NPO-14127 B78-10459 01  
 Measuring radio-signal power accurately  
 NPO-13373 B78-10464 02

**AUTOMATIC TEST EQUIPMENT**  
 Automated tester for MOS devices  
 NPO-14088 B78-10001 01  
 Curve tracer checks CMOS IC's  
 GSFC-12209 B78-10007 01  
 Strobe-margin test for plated memory systems  
 M-FS-23838 B78-10154 01  
 Monitoring systems for community water supplies  
 MSC-16778 B78-10233 05  
 Water sample-collection and distribution system  
 MSC-16841 B78-10235 05  
 Testing integrated circuits by photoexcitation  
 M-FS-23943 B78-10451 01  
 Multiplexed battery-bypass control system  
 NPO-14414 B78-10474 02  
 Multiple-sample holder for IC testing  
 NPO-14314 B78-10540 06

**AUTOMOBILE ENGINES**  
 Boosting the power of two-stage engines  
 NPO-14057 B78-10105 07  
 Real-time instrument averages 100 data sets  
 LEWIS-13093 B78-10534 06

**AUTOMOBILES**  
 Heat resistant nontoxic laminate  
 ARC-11040 B78-10356 04  
 Electric and hybrid vehicles  
 LEWIS-13077 B78-10423 07  
 Low-cost graphite/epoxy structural panels  
 M-FS-23871 B78-10427 08  
 Stirling-engine design manual  
 LEWIS-13098 B78-10580 07

**AUXILIARY POWER SOURCES**  
 Efficient dc-to-dc converter  
 FRC-11014 B78-10012 01  
 Wind-wheel electric power generator  
 M-FS-23515 B78-10268 07

**AVALANCHE DIODES**  
 All-ion-implantation process for integrated circuits  
 M-FS-23995 B78-10590 08

**AVIONICS**  
 Approach and landing simulation  
 LANGLEY-12060 B78-10091 06

**AXES OF ROTATION**  
 Improved notation controller  
 GSFC-12273 B78-10383 06

**AXIAL LOADS**

Design of transmission shafting  
 LEWIS-12965 B78-10107 07

**AXISYMMETRIC BODIES**

Potential flows in propulsion system inlets  
 LEWIS-13010 B78-10553 06

**AXISYMMETRIC FLOW**

Flow in axisymmetric ducts with struts  
 LEWIS-12798 B78-10556 06

**B****BACKGROUND NOISE**

Low-background trace-gas detector  
 NPO-13683 B78-10168 03

**BACTERIA**

Microbial desulfurization of coal  
 NPO-14227 B78-10038 04  
 Bacillus cereus strain MCN as a debriding agent  
 LANGLEY-12287 B78-10067 05  
 Rapid measurement of bacteria in water  
 GSFC-12158 B78-10232 05  
 Automated electrochemical selection of coliforms  
 MSC-16777 B78-10236 05  
 Chemiluminescence and bioluminescence microbe detection  
 MSC-16779 B78-10237 05

**BAGS**

Verifying the fit of mating contoured surfaces  
 LANGLEY-11731 B78-10290 08

**BALL BEARINGS**

Thermal performance of shaft bearing system  
 LEWIS-12761 B78-10263 06  
 Elastic deformation of ball bearings, gears, and cams  
 LEWIS-13076 B78-10544 06

**BALLISTICS**

Measuring projectile speed  
 LANGLEY-12387 B78-10538 06

**BANDPASS FILTERS**

Improved optical filter  
 GSFC-12225 B78-10027 03

**BANDWIDTH**

Adaptive polarization separation experiments  
 LANGLEY-12196 B78-10006 01  
 Narrow-bandwidth receiver  
 GSFC-12142 B78-10463 02  
 Determining the response of an FM receiver  
 MSC-16751 B78-10465 02

**BARRIER LAYERS**

Improved thermal-tile barrier  
 MSC-16929 B78-10133 08  
 Metallic thermal seal  
 MSC-18135 B78-10566 07

**BASIC (PROGRAMMING LANGUAGE)**

Processor for the UNIVAC 1100 series  
 NPO-13469 B78-10600 09

**BATTERY CHARGERS**

Multiplexed battery-bypass control system  
 NPO-14414 B78-10474 02

**BEAM LEADS**

Flicking-wire drag tensioner  
 MSC-16367 B78-10109 07

**BEAM SPLITTERS**

Improved double-pass michelson interferometer  
 NPO-13999 B78-10177 03

**BEAMS (SUPPORTS)**

Analysis of beam columns  
 MSC-18009 B78-10402 06  
 Plotting max/min data envelopes  
 MSC-18016 B78-10597 09

**BEARINGS**

Improved gas thrust bearings  
 LEWIS-12569 B78-10413 07

**BELLOWS**

Embrittlement proof nickel-alloy bellows  
 M-FS-19331 B78-10349 04  
 Lines, bellows, flexible hoses, and filters  
 LEWIS-13077 B78-10424 07  
 Transmitting rotary motion at an angle  
 MSC-19483 B78-10561 07

**BENDING**

Bend-absorbing clamp  
 MSC-16971 B78-10575 07

**BENDING FATIGUE**

Design of transmission shafting  
 LEWIS-12965 B78-10107 07

**BINARY DIGITS**

Detecting and correcting bit errors on magnetic tape  
 NPO-13842 B78-10294 09

**BINDERS (MATERIALS)**

Improved alkali-metal/silicate binders  
 GSFC-12303 B78-10224 04  
 Installing fiber insulation in tight spaces  
 MSC-16934 B78-10289 08  
 Fire-resistant wood composites  
 ARC-11174 B78-10508 04

**BIOASSAY**

Biological sampling and cleaning device  
 NPO-14010 B78-10245 05

**BIOENGINEERING**

Remotely-powered intracranial pressure monitor  
 ARC-11120 B78-10362 05  
 Sweat collection capsule  
 ARC-11031 B78-10367 05  
 Biocompatibility of surgical implants  
 NPO-14291 B78-10368 05  
 Improved myocardium transducer  
 NPO-14107 B78-10372 05  
 Implantable digital hearing aid  
 KSC-11009 B78-10373 05  
 Wideband EMG telemetry system  
 ARC-11209 B78-10375 05

**BIOINSTRUMENTATION**

Monitoring systems for community water supplies  
 MSC-16778 B78-10233 05  
 Water sample-collection and distribution system  
 MSC-16841 B78-10235 05  
 Chemiluminescence and bioluminescence microbe detection  
 MSC-16779 B78-10237 05  
 Retainer for laboratory animals  
 LANGLEY-12353 B78-10371 05  
 Improved probe for rectal-cancer detection  
 NPO-14247 B78-10531 05  
 Self-propelling, self-locating colonoscope  
 NPO-14092 B78-10532 05

**BIOLUMINESCENCE**

Chemiluminescence and bioluminescence microbe detection  
 MSC-16779 B78-10237 05

**BIOMEDICAL DATA**

- Portable data system  
ARC-11136 878-10316 02  
Microprocessor-based cardiopulmonary monitor  
MSC-18235 878-10369 05

**BIOSYNTHESIS**

- Boosting production yield of biomedical peptides  
NPO-14142 878-10240 05

**BIOTELEMETRY**

- Wideband EMG telemetry system  
ARC-11209 878-10375 05  
Self-propelling, self-locating colonoscope  
NPO-14092 878-10532 05

**BIREFRINGENCE**

- Improved optical filter  
GSFC-12225 878-10027 03

**BIT SYNCHRONIZATION**

- Bit-synchronizer lock detector  
MSC-16744 878-10164 02

**BITS**

- Detecting and correcting bit errors on magnetic tape  
NPO-13842 878-10294 09  
28-Bit serial word simulator/monitor  
MSC-16418 878-10315 02

**BLADES (CUTTERS)**

- 'Space slitter' for film or tape  
KSC-10894 878-10138 08  
A sharp knife for high temperatures  
MSC-16932 878-10278 07

**BLOCK DIAGRAMS**

- Marshall system for aerospace simulation  
M-FS-22672 878-10296 09

**BLOOD**

- Automated chromosome analysis  
NPO-13913 878-10364 05  
Automated electrophoresis apparatus  
M-FS-23983 878-10516 04

**BLOOD FLOW**

- Dip-molded t-shaped cannula  
NPO-14073 878-10062 05  
In vivo blood-flow mapping  
NPO-14133 878-10244 05

**BLOOD PRESSURE**

- Hand-held vital-signals monitor  
MSC-18232 878-10524 05

**BLOOD VESSELS**

- A probe for blood-vessel and spinal interiors  
NPO-14132 878-10242 05  
In vivo blood-flow mapping  
NPO-14133 878-10244 05

**BOARDS (PAPER)**

- 'Space slitter' for film or tape  
KSC-10894 878-10138 08

**BODY FLUIDS**

- Sweat collection capsule  
ARC-11031 878-10367 05

**BODY MEASUREMENT (BIOLOGY)**

- Remotely-powered intracranial pressure monitor  
ARC-11120 878-10362 05  
Microprocessor-based cardiopulmonary monitor  
MSC-18235 878-10369 05  
Hybrid respiration-signal conditioner  
MSC-18226 878-10527 05

**BODY TEMPERATURE**

- Hand-held vital-signals monitor  
MSC-18232 878-10524 05  
Hybrid temperature-monitoring circuit  
MSC-18231 878-10525 05

**BOILERS**

- Energy conversion alternatives study  
LEWIS-13096 878-10330 03

**BOLTS**

- Ultrasonic extensometer measures bolt preload  
M-FS-19337 878-10271 07  
Antibackoff lock for nuts and bolts  
MSC-16472 878-10409 07

**BONDING**

- Flicking-wire drag tensioner  
MSC-16367 878-10109 07  
Form die and glide plates for vacuum brazing  
MSC-16549 878-10113 08  
High-vacuum, low-temperature bond for second-surface mirrors  
M-FS-23405 878-10124 08  
Bonding Kovar pins to an alumina substrate  
MSC-16828 878-10130 08  
'PC fabrication' for silicon solar-cell arrays  
NPO-13991 878-10131 08  
Improved method of solar-cell assembly  
LEWIS-12729 878-10438 08  
Breather cloth for vacuum curing  
MSC-18063 878-10440 08  
Applying uniform adhesive coatings  
MSC-19462 878-10583 08  
Preparing thin aluminum films for adhesive bonding  
NPO-14357 878-10591 08

**BONE MARROW**

- Body/bone-marrow  
ture sensor  
NPO-14121 878-10066 05

**BOOLEAN ALGEBRA**

- Representation of multivalued logic functions  
NPO-13760 878-10596 09

**BOOMS (EQUIPMENT)**

- Collapsible module extends tenfold in height  
NPO-13371 878-10280 07

**BORON CARBIDES**

- Brazed boron-silicon carbide/aluminum structural panels  
LANGLEY-12244 878-10221 04

**BORON REINFORCED MATERIALS**

- Ultra-high-strength boron fibers  
LEWIS-12739 878-10051 04

**BOROSILICATE GLASS**

- Protective coating for laser diodes  
LANGLEY-11746 878-10171 03

**BOUNDARY LAYER FLOW**

- Detection of boundary-layer transitions in wind tunnels  
LANGLEY-12261 878-10255 06  
Internal and external 2-d boundary layer flows  
LEWIS-13009 878-10260 06

**BOUNDARY LAYER STABILITY**

- Detection of boundary-layer transitions in wind tunnels  
LANGLEY-12261 878-10255 06

**BOUNDARY LAYERS**

- Tumbling-vehicle entry heating  
M-FS-23712 878-10555 06

**BOURDON TUBES**

- Pressure-sensitive glass reaction cell  
LANGLEY-11256 878-10223 04

**BRAGG ANGLE**

- Measurement of subcoat thickness by characteristic x-rays  
MSC-16718 878-10505 04

**BRAKING**

- Dynamic braking of bidirectional motors  
ARC-11194 878-10578 07

**BRAZING**

- High-temperature brazing of stainless steel  
MSC-19459 878-10112 08  
Form die and glide plates for vacuum brazing  
MSC-16549 878-10113 08  
Internal grid for release of brazing retorts  
MSC-19472 878-10114 08  
Vacuum control for brazing stainless steel  
MSC-19457 878-10115 08  
Process fabricates flat panels at high temperatures  
MSC-16969 878-10116 08  
Two braze alloys for thin-wall components  
M-FS-19206 878-10117 08  
Compatibility of Au-Cu-Ni braze alloy with NH<sub>3</sub>  
MSC-16864 878-10219 04  
Brazed boron-silicon carbide/aluminum structural panels  
LANGLEY-12244 878-10221 04  
Repairing pin-fin cold plates  
MSC-16424 878-10431 08  
Brazing dissimilar aluminum alloys  
MSC-16340 878-10587 08

**BRIGHTNESS**

- Z-axis control loop for cathode-ray tubes  
NPO-13775 878-10305 01

**BRITTLE MATERIALS**

- Tile-bonding tool  
KSC-11053 878-10134 08  
'Gentle' holder for brittle ceramics  
MSC-19645 878-10552 06

**BUDGETING**

- Price and cost estimation  
M-FS-23812 878-10599 09

**BULK MODULUS**

- Dynamic measurement of bulk modulus  
NPO-13226 878-10543 06

**BURNING TIME**

- Fire-resistant wood composites  
ARC-11174 878-10508 04

**BURNS (INJURIES)**

- Directory of fire research specialists  
LEWIS-13123 878-10399 06

**BUTT JOINTS**

- Detecting overpenetration of electron-beam welds  
M-FS-19396 878-10586 08

**BYPASSES**

- Multiplexed battery-bypass control system  
NPO-14414 878-10474 02  
Automatic bypass valve  
LANGLEY-12063 878-10558 07  
Compact bypass-flow filter  
MSC-18311 878-10564 07

**C****CALCIUM OXIDES**

- High-yield process for preparing calcium superoxide  
ARC-11053 878-10216 04

**CALCULATORS**

- Wire selector/calculator  
MSC-16632 878-10120 08

**CALIBRATING**

Calibration method for an ultrasonic gray-scale recorder

LEWIS-12782 B78-10016 02

High-resolution gray-scale recorder

LEWIS-12783 B78-10017 02

Improved strain-gage calibration

MSC-16852 B78-10074 06

Calibration target for temperature radiometer

LANGLEY-12239 B78-10083 06

Mass spectrometer calibration standard

NPO-14097 B78-10249 06

Calibration standards for PIND tests

MSC-18169 B78-10388 06

Standardized gas-temperature probes

LEWIS-13059 B78-10392 06

Orifice calibration module

LANGLEY-12269 B78-10393 06

High-sampling-rate pressure transducer

LANGLEY-12230 B78-10536 06

**CAMERA SHUTTERS**

Wide angle pinhole camera

LANGLEY-11905 B78-10173 03

**CAMERAS**

Wide angle pinhole camera

LANGLEY-11905 B78-10173 03

**CAMS**

Elastic deformation of ball bearings, gears, and cams

LEWIS-13076 B78-10544 06

**CANCELLATION**

Adaptive polarization separation experiments

LANGLEY-12196 B78-10006 01

**CANCER**

Improved probe for rectal-cancer detection

NPO-14247 B78-10531 05

**CANNULAE**

Dip-molded t-shaped cannula

NPO-14073 B78-10062 05

**CANS**

Self-sterilizing canister

NPO-14237 B78-10064 05

Thermal-control canister

GSFC-12253 B78-10079 06

**CAPACITANCE**

Improved driver for capacitive loads

LANGLEY-11609 B78-10304 01

**CAPACITORS**

High-temperature capacitive pressure transducer

LEWIS-13078 B78-10398 06

Control of dielectric film deposition

LEWIS-13092 B78-10430 08

All-ion-implantation process for integrated circuits

M-FS-23995 B78-10590 08

**CARBON DIOXIDE CONCENTRATION**

Measurement of total organic concentration in water

MSC-16497 B78-10048 04

**CARBON DIOXIDE LASERS**

Laser wire stripping

MSC-18000 B78-10118 08

Low-power tuner for lasers

M-FS-23863 B78-10486 03

**CARBON FIBER REINFORCED PLASTICS**

Effects of moisture on graphite/epoxy composites

MSC-18045 B78-10360 04

Low-cost graphite/epoxy structural panels

M-FS-23871 B78-10427 08

**CARBON FIBERS**

Response of graphite/epoxy composites to moisture

MSC-16899 B78-10228 04

**CARBON STEELS**

High-temperature brazing of stainless steel

MSC-19459 B78-10112 08

**CARBONATES**

Fire-and smoke-retardant polyesters and elastomers

NPO-14053 B78-10058 04

**CARDIOGRAMS**

Microprocessor-based cardiopulmonary monitor

MSC-18235 B78-10369 05

**CARDIOVASCULAR SYSTEM**

Improved myocardium transducer

NPO-14107 B78-10372 05

**CARRIER INJECTION**

All-ion-implantation process for integrated circuits

M-FS-23995 B78-10590 08

**CASES (CONTAINERS)**

Fire-retardant covering for small containers

ARC-11104 B78-10354 04

**CAST ALLOYS**

Brazing dissimilar aluminum alloys

MSC-16340 B78-10587 08

**CASTING**

Void-free foam insulation

MSC-16805 B78-10127 08

Portable fluorescent-dye inspection device

M-FS-24019 B78-10139 08

High-gradient continuous-casting furnace

LEWIS-12934 B78-10425 08

**CATALYSTS**

Hydrogen enrichment of synthetic fuel

M-FS-23279 B78-10039 04

Improved imide polymerization catalyst

ARC-11107 B78-10517 04

**CATECHOLAMINE**

Chemical measurement of urine volume

MSC-16585 B78-10238 05

**CATHETERIZATION**

In vivo blood-flow mapping

NPO-14133 B78-10244 05

**CATHETEROMETERS**

A probe for blood-vessel and spinal interiors

NPO-14132 B78-10242 05

**CATHODE RAY TUBES**

Accurate positioning of characters on CRT displays

MSC-16505 B78-10014 02

Z-axis control loop for cathode-ray tubes

NPO-13775 B78-10305 01

Plotting shear-flow forces

MSC-18013 B78-10445 09

**CATHODES**

Ion-beam-textured graphite

LEWIS-12724 B78-10506 04

**CELLS (BIOLOGY)**

Automated chromosome analysis

NPO-13913 B78-10364 05

Separating biological cells

M-FS-23883 B78-10521 05

**CEMENTATION**

Bonding Kovar pins to an alumina substrate

MSC-16828 B78-10130 08

**CEMENTS**

Bonding Kovar pins to an alumina substrate

MSC-16828 B78-10130 08

**CENTRAL PROCESSING UNITS**

Multipurpose system simulator

GSFC-12333 B78-10444 09

**CENTRIFUGAL PUMPS**

Drag-pump rotating filter

MSC-16180 B78-10563 07

**CERAMIC BONDING**

Tile-bonding tool

KSC-11053 B78-10134 08

Ceramic-to-metal vacuum seal

NPO-13803 B78-10437 08

**CERAMIC COATINGS**

Measurement of subcoat thickness by characteristic x-rays

MSC-16718 B78-10505 04

**CERAMICS**

Improved thermal-tile barrier

MSC-16929 B78-10133 08

'Gentle' holder for brittle ceramics

MSC-19645 B78-10552 06

**CEREBRUM**

Remotely-powered intracranial pressure monitor

ARC-11120 B78-10362 05

**CHAINS**

Modified pipe extension safely releases chain binders

MSC-16937 B78-10103 07

**CHARGE DISTRIBUTION**

Antistatic coating for acrylics

NPO-13867 B78-10509 04

Low partial discharge vacuum feedthrough

GSFC-12347 B78-10559 07

**CHARGED PARTICLES**

Portable spark-gap arc generator

LEWIS-12886 B78-10008 01

Power loss for high-voltage solar-cell arrays

LEWIS-12865 B78-10340 03

Automated electrophoresis apparatus

M-FS-23983 B78-10516 04

**CHARTS**

'Space slitter' for film or tape

KSC-10894 B78-10138 08

**CHECKOUT**

Fuseholders allow fast system checkout

MSC-16856 B78-10088 06

Performance evaluation of an air solar collector

M-FS-23968 B78-10338 03

Outdoor tests of a liquid solar collector

M-FS-23969 B78-10339 03

**CHEMICAL ANALYSIS**

Modified chemiluminescent NO analyzer accurately measures NOX

LEWIS-12850 B78-10047 04

Improved 'spectrophone'

NPO-14143 B78-10167 03

Measuring metallic concentrations in glycol solutions

M-FS-23894 B78-10211 03

Improvements in microelectrophoresis apparatus

ARC-11121 B78-10247 05

Thermoelectrically-cooled

erature probe

MSC-18192 B78-10484 03

**CHEMICAL ATTACK**

Corrosion detection and evaluation

M-FS-24436 B78-10227 04

Embrittlement proof nickel-alloy bellows

M-FS-19331 B78-10349 04

- Corrosion inhibitors for solar-heating and cooling  
M-FS-25023 878-10501 03
- CHEMICAL BONDS**  
Predicting structures of cross-linked condensation polymers  
NPO-14007 878-10352 04  
Fire-resistant wood composites  
ARC-11174 878-10508 04
- CHEMICAL REACTION CONTROL**  
High-yield process for preparing calcium superoxide  
ARC-11053 878-10216 04  
Boosting production yield of biomedical peptides  
NPO-14142 878-10240 05
- CHEMICAL REACTIONS**  
Coal desulfurization with iron pentacarbonyl  
NPO-14272 878-10342 04  
Low-temperature elastomer production and curing  
NPO-13899 878-10346 04  
Economical synthesis of potassium superoxide  
ARC-10992 878-10353 04  
Reducing stickiness of elastomer valve seals  
LANGLEY-11778 878-10565 07
- CHEMICAL REACTORS**  
Model of silicon production in a fluidized-bed reactor  
NPO-14404 878-10520 04
- CHEMICAL TESTS**  
Improvements in microelectrophoresis apparatus  
ARC-11121 878-10247 05  
Fluidic-oscillator gas analyzer  
KSC-11014 878-10253 06
- CHEMILUMINESCENCE**  
Modified chemiluminescent NO analyzer accurately measures NOX  
LEWIS-12850 878-10047 04  
Chemiluminescence and bioluminescence microbe detection  
MSC-16779 878-10237 05  
NO<sub>2</sub> measurement by chemiluminescence  
LANGLEY-11378 878-10386 06
- CHROMATOGRAPHY**  
High-pressure liquid chromatography of aromatic amines  
LANGLEY-12163 878-10515 04  
Porous bead packings for gas chromatography  
ARC-11222 878-10518 04
- CHROMIUM**  
Low-chromium stainless steels  
LEWIS-12543 878-10046 04
- CHROMIUM ALLOYS**  
Two braze alloys for thin-wall components  
M-FS-19206 878-10117 08
- CHROMIUM STEELS**  
A sharp knife for high temperatures  
MSC-16932 878-10278 07
- CHROMOSOMES**  
Automated chromosome analysis  
NPO-13913 878-10364 05
- CIRCUIT BOARDS**  
Simple tool removes IC flat packs  
MSC-16058 878-10010 01  
Ultrasonic evaluation of high-voltage circuit boards  
LEWIS-12781 878-10087 06  
Bench-top soldering aid for PC boards  
MSC-16274 878-10121 08
- No-warp potted circuits  
MSC-19729 878-10435 08  
Circuit-lead trimming template  
MSC-16589 878-10439 08  
Localized cooling of electronic components  
LANGLEY-11955 878-10569 07
- CIRCUIT DIAGRAMS**  
CMOS bulk-metal design handbook  
M-FS-23856 878-10142 08
- CIRCUIT PROTECTION**  
Electrical-ground monitor  
MSC-18281 878-10455 01  
Overload protection system  
NPO-13872 878-10460 01  
Load balancing multimodule switching power converters  
NPO-13832 878-10461 01  
Voltage regulator for solar panels  
NPO-13895 878-10478 03
- CIRCUIT RELIABILITY**  
Gate-assisted turn-off thyristor  
LEWIS-12535 878-10004 01  
Shock during PIND test frees particles  
M-FS-23829 878-10389 06
- CIRCUITS**  
Representation of multivalued logic functions  
NPO-13760 878-10596 09
- CIRCULAR ORBITS**  
Helicopter position stabilizing system  
LANGLEY-11670 878-10256 06
- CIRCULAR TUBES**  
Glass tubes for protecting solar cells  
NPO-14200 878-10031 03  
Self-centering stepped piston  
LEWIS-12997 878-10101 07
- CIRCULATORS (PHASE SHIFT CIRCUITS)**  
More efficient microwave-power transmission  
NPO-13885 878-10466 02
- CIRCULATORY SYSTEM**  
Improved myocardium transducer  
NPO-14107 878-10372 05
- CLAMPS**  
Gentle support stands for fluid-line mockups  
MSC-16479 878-10291 08  
Quick locking/unlocking retainer  
MSC-18048 878-10408 07  
Fastener for thin fragile materials  
MSC-18097 878-10436 08  
Fastener for thermal insulation blankets  
MSC-18253 878-10571 07  
Bend-absorbing clamp  
MSC-16971 878-10575 07
- CLARITY**  
Compact turbidity meter  
KSC-11063 878-10545 06
- CLASSIFICATIONS**  
Directory of fire research specialists  
LEWIS-13123 878-10399 06  
Postprocessing classification images  
MSC-18238 878-10601 09
- CLEAN ENERGY**  
Solar-heating system design data brochure  
M-FS-23977 878-10492 03  
Solar-heating system performance tests  
M-FS-25021 878-10493 03  
Design and installation of a flat-plate solar collector  
M-FS-25010 878-10498 03
- CLEANING**  
Electroplating and stripping copper on molybdenum and niobium  
LEWIS-12151 878-10055 04  
Biological sampling and cleaning device  
NPO-14010 878-10245 05  
Microcircuit-cleaning machine  
MSC-16060 878-10292 08  
Shock during PIND test frees particles  
M-FS-23829 878-10389 06
- CLEARANCES**  
Reducing weld peaking in aluminum  
M-FS-23973 878-10433 08
- CLEAVAGE**  
Precision cleaver for 'soft' crystals  
GSFC-12291 878-10348 04
- CLIPS**  
Quick locking/unlocking retainer  
MSC-18048 878-10408 07  
Fastener for thin fragile materials  
MSC-18097 878-10436 08  
Fastener for thermal insulation blankets  
MSC-18253 878-10571 07
- CLOCKS**  
Hybrid clock generator  
MSC-18228 878-10530 05
- CLOSED CIRCUIT TELEVISION**  
Infrared-enhanced TV for fire detection  
M-FS-19380 878-10172 03
- CLOSURES**  
Low-leakage low-temperature valve  
MSC-18087 878-10420 07  
Ceramic-to-metal vacuum seal  
NPO-13803 878-10437 08
- CLOTHING**  
Automated controller for liquid-cooled garments  
MSC-18055 878-10365 05
- COAGULATION**  
resterilizable electrode for electrosurgery  
HQN-10915 878-10370 05
- COAL**  
Microbial desulfurization of coal  
NPO-14227 878-10038 04  
Coal desulfurization with iron pentacarbonyl  
NPO-14272 878-10342 04  
Improved nucleonic coal-thickness monitor  
M-FS-23725 878-10344 04  
Coal mining with a liquid solvent  
NPO-14028 878-10345 04  
Low-temperature refining of coal  
NPO-14210 878-10511 04
- COAL LIQUEFACTION**  
Coal liquefaction to increase jet fuel production  
LANGLEY-12038 878-10343 04  
Coal mining with a liquid solvent  
NPO-14028 878-10345 04
- COAL UTILIZATION**  
Energy conversion alternatives study  
LEWIS-13096 878-10330 03  
Coal mining with a liquid solvent  
NPO-14028 878-10345 04
- COANDA EFFECT**  
Wing aerodynamics under blowing jets  
LANGLEY-12256 878-10401 06
- COATING**  
Holding fixture for variable-contour parts  
MSC-16270 878-10429 08  
Control of dielectric film deposition  
LEWIS-13092 878-10430 08  
Scratch resistant plastic lenses  
ARC-11039 878-10519 04

- Coating for hot sliding seals  
MSC-16529 B78-10562 07
- COATINGS**  
Electrically-conducting thermal-control coating  
GSFC-12207 B78-10044 04  
Fast-drying coating  
MSC-16056 B78-10060 04  
High-temperature waterproofing for tiles  
MSC-16773 B78-10135 08  
Repairing silicon carbide coatings  
MSC-18033 B78-10226 04  
Protective coating for copper in aluminum heat exchangers  
M-FS-19334 B78-10286 08  
Natural-oxide solar-collector coatings  
M-FS-23518 B78-10326 03  
Fire-retardant covering for small containers  
ARC-11104 B78-10354 04  
Ion-beam texturing of materials  
LEWIS-12996 B78-10357 04  
Measurement of subcoat thickness by characteristic x-rays  
MSC-16718 B78-10505 04  
Antistatic coating for acrylics  
NPO-13867 B78-10509 04  
Forming 'dynamic' membranes on stainless steel  
MSC-18172 B78-10513 04  
Applying uniform adhesive coatings  
MSC-19462 B78-10583 08
- COAXIAL CABLES**  
Coaxial isolator has versatile interface  
MSC-16908 B78-10009 01
- CODING**  
Noise tolerant computer link  
NPO-14152 B78-10160 02  
Efficient digital encoding scheme  
MSC-18267 B78-10467 02  
Eliminating ambiguity in digital signals  
NPO-14289 B78-10469 02
- COHERENT ELECTROMAGNETIC RADIATION**  
Common-cavity pumped laser  
GSFC-12237 B78-10320 03  
Vacuum-ultraviolet laser uses superfluid helium  
NPO-13993 B78-10323 03
- COILS**  
Safe, durable soil sampler  
MSC-18171 B78-10577 07
- COLD SURFACES**  
Repairing pin-fin cold plates  
MSC-16424 B78-10431 08
- COLLECTION**  
Safe, durable soil sampler  
MSC-18171 B78-10577 07
- COLLOIDS**  
Accelerated purification of colloidal silica sols  
MSC-16793 B78-10512 04
- COLOR**  
Laser beam color separator  
LANGLEY-11806 B78-10174 03
- COLOR TELEVISION**  
Processing multispectral signals from a discrete-sensor array  
NPO-14211 B78-10442 09
- COLORIMETRY**  
A probe for blood-vessel and spinal interiors  
NPO-14132 B78-10242 05

**COMBINED STRESS**

- Stress analysis under component relative interference fit  
LEWIS-12911 B78-10261 06

**COMBUSTION**

- Penetrating fire extinguisher  
KSC-11064 B78-10397 06

**COMBUSTION CHAMBERS**

- Simpler valve for reciprocating engines  
MSC-16239 B78-10276 07

**COMBUSTION EFFICIENCY**

- Boosting the power of two-stage engines  
NPO-14057 B78-10105 07  
Stirling-engine design manual  
LEWIS-13098 B78-10580 07

**COMMAND AND CONTROL**

- Verification of redundancy management design  
MSC-16713 B78-10145 09

**COMMUNICATION CABLES**

- Calculating wire-bundle diameter  
MSC-16378 B78-10119 08  
Splicing shielded cables  
MSC-18297 B78-10453 01

**COMMUNICATION EQUIPMENT**

- Microstrip backfire antenna  
LANGLEY-12172 B78-10019 02  
Automatic circuit interrupter  
MSC-16697 B78-10300 01  
Implementing OQASK by using MSK  
NPO-13896 B78-10309 01  
Noncontact optical communication between moving stations  
LANGLEY-12283 B78-10377 06  
Processing multispectral signals from a discrete-sensor array  
NPO-14211 B78-10442 09

**COMPARATORS**

- Femtosecond time-domain phase comparator  
GSFC-12228 B78-10162 02  
Automatic radio-transmission monitor  
NPO-13941 B78-10165 02  
Pseudo-continuous-wave acoustic instrument  
LANGLEY-12260 B78-10248 06  
Automatic gain-balancing circuit  
LANGLEY-12074 B78-10297 01

**COMPATIBILITY**

- Biocompatibility of surgical implants  
NPO-14291 B78-10368 05  
Compression testing of flammable liquids  
MSC-16121 B78-10548 06

**COMPENSATORS**

- Thermal compensator for helium refrigerators  
GSFC-12168 B78-10082 06  
Improved servocontrol system  
M-FS-19358 B78-10150 01

**COMPONENT RELIABILITY**

- Curve tracer checks CMOS IC's  
GSFC-12209 B78-10007 01  
Multiple-sample holder for IC testing  
NPO-14314 B78-10540 06

**COMPOSITE MATERIALS**

- Ultra-high-strength boron fibers  
LEWIS-12739 B78-10051 04  
Partial interlaminar separation for composites  
LANGLEY-12065 B78-10052 04  
Response of graphite/epoxy composites to moisture  
MSC-16899 B78-10228 04

- Testing composite sheets at high temperatures  
MSC-16237 B78-10252 06  
Friction of thick laminates  
LANGLEY-12010 B78-10284 08  
Effects of moisture on graphite/epoxy composites  
MSC-18045 B78-10360 04  
Fire-resistant wood composites  
ARC-11174 B78-10508 04

**COMPOSITE STRUCTURES**

- Void-free bends in laminated structures  
MSC-16998 B78-10285 08  
Fire-retardant lightweight composite  
ARC-10918 B78-10355 04  
Heat resistant nontoxic laminate  
ARC-11040 B78-10356 04  
Lattice panels with high structural efficiency  
LANGLEY-11898 B78-10426 08  
Low-cost graphite/epoxy structural panels  
M-FS-23871 B78-10427 08  
Detecting moisture in composite honeycomb panels  
MSC-16750 B78-10550 06

**COMPOSITION (PROPERTY)**

- Instrument measures many optical properties in visible and IR  
LANGLEY-12285 B78-10489 03

**COMPRESSED GAS**

- Topping pressure for gas-storage cylinders  
MSC-18186 B78-10542 06

**COMPRESSIBILITY**

- Verifying the fit of mating contoured surfaces  
LANGLEY-11731 B78-10290 08  
Dynamic measurement of bulk modulus  
NPO-13226 B78-10543 06

**COMPRESSIBLE FLOW**

- Flow in axisymmetric ducts with struts  
LEWIS-12798 B78-10556 06  
Automatic bypass valve  
LANGLEY-12063 B78-10558 07

**COMPRESSING**

- Improved strain-gage calibration  
MSC-16852 B78-10074 06

**COMPRESSION TESTS**

- Compression testing of flammable liquids  
MSC-16121 B78-10548 06

**COMPRESSOR ROTORS**

- Gas-path seal material  
LEWIS-12623 B78-10347 04

**COMPUTATION**

- Noise calculation on the basis of vortex flow models  
LANGLEY-12271 B78-10078 06

**COMPUTER ASSISTED INSTRUCTION**

- Computer interface for mechanical arm  
M-FS-23849 B78-10015 02

**COMPUTER GRAPHICS**

- Accurate positioning of characters on CRT displays  
MSC-16505 B78-10014 02

**COMPUTER PROGRAMS**

- Detecting servo failures with software  
FRC-11003 B78-10396 06

**COMPUTER STORAGE DEVICES**

- Strobe-margin test for plated memory systems  
M-FS-23838 B78-10154 01  
Detecting and correcting bit errors on magnetic tape  
NPO-13842 B78-10294 09



- CMOS-array design-automation techniques  
M-FS-23762 878-10311 01  
One-third selection for matrix-addressing ferroelectrics  
LANGLEY-11993 878-10456 01
- COMPUTER SYSTEMS DESIGN**  
28-Bit serial word simulator/monitor  
MSC-16418 878-10315 02
- COMPUTER SYSTEMS PROGRAMS**  
Marshall system for aerospace simulation  
M-FS-22672 878-10296 09
- COMPUTER TECHNIQUES**  
Noise tolerant computer link  
NPO-14152 878-10160 02  
Automated chromosome analysis  
NPO-13913 878-10364 05
- COMPUTERIZED DESIGN**  
Edge geometry of turbomachine blades  
LEWIS-12979 878-10262 06  
Structural performance analysis and redesign  
LANGLEY-12213 878-10264 06
- COMPUTERIZED SIMULATION**  
Approach and landing simulation  
LANGLEY-12060 878-10091 06  
Hydraulic dynamic analysis  
MSC-16795 878-10095 06  
Three-phase induction motors  
MSC-16904 878-10281 07  
Detecting servo failures with software  
FRC-11003 878-10396 06
- COMPUTERS**  
Multipurpose system simulator  
GSFC-12333 878-10444 09
- CONCENTRATION (COMPOSITION)**  
Measuring metallic concentrations in glycol solutions  
M-FS-23894 878-10211 03
- CONCENTRATORS**  
High-temperature solar converter  
GSFC-12234 878-10032 03  
Improved conical solar concentrator  
NPO-13825 878-10187 03  
Concentrating solar collector-installation package  
M-FS-25068 878-10500 03
- CONDUCTIVE HEAT TRANSFER**  
Vibration-free thermal link  
GSFC-12297 878-10169 03  
Convectively cooled structures  
LANGLEY-12347 878-10404 06
- CONICAL BODIES**  
Improved conical solar concentrator  
NPO-13825 878-10187 03  
Lightweight conical antenna reflector  
NPO-13552 878-10472 02
- CONNECTORS**  
Automatic circuit interrupter  
MSC-16697 878-10300 01  
Modular ground-wire connector  
MSC-16633 878-10454 01  
Miniature thermocouple disconnect  
LANGLEY-12013 878-10535 06
- CONSECUTIVE EVENTS**  
Measuring projectile speed  
LANGLEY-12387 878-10538 06
- CONSTRAINTS**  
Performance optimizing  
LANGLEY-11930 878-10096 06  
Spring control of wire harness loops  
MSC-18246 878-10411 07
- CONSTRUCTION**  
Analysis of beam columns  
MSC-18009 878-10402 06
- CONSTRUCTION MATERIALS**  
Lattice panels with high structural efficiency  
LANGLEY-11898 878-10426 08  
Fire-resistant wood composites  
ARC-11174 878-10508 04
- CONTAMINANTS**  
Simple air-piston gas-sampling system  
LEWIS-12922 878-10110 07  
Low-background trace-gas detector  
NPO-13683 878-10168 03
- CONTAMINATION**  
Simple air-piston gas-sampling system  
LEWIS-12922 878-10110 07  
Rapid measurement of bacteria in water  
GSFC-12158 878-10232 05  
Monitoring systems for community water supplies  
MSC-16778 878-10233 05
- CONTENT**  
Noncontact measurement of angular deflection  
LANGLEY-12178 878-10071 06
- CONTOURS**  
Process fabricates flat panels at high temperatures  
MSC-16969 878-10116 08  
Verifying the fit of mating contoured surfaces  
LANGLEY-11731 878-10290 08  
Holding fixture for variable-contour parts  
MSC-16270 878-10429 08  
Contouring pile-brush seals  
MSC-16231 878-10588 08
- CONTROL BOARDS**  
Computer interface for mechanical arm  
M-FS-23849 878-10015 02
- CONTROL EQUIPMENT**  
Programmable controller for solar heating  
M-FS-23915 878-10183 03  
Z-axis control loop for cathode-ray tubes  
NPO-13775 878-10305 01  
Automated controller for liquid-cooled garments  
MSC-18055 878-10365 05  
Shaft speed control  
NPO-14170 878-10416 07
- CONTROL MOMENT GYROSCOPES**  
Helicopter position stabilizing system  
LANGLEY-11670 878-10256 06
- CONTROL SURFACES**  
Subminiature hydraulic actuator  
LANGLEY-11522 878-10269 07
- CONTROL THEORY**  
Algorithms for linear-systems control  
LANGLEY-12313 878-10443 09
- CONTROLLERS**  
Multichannel temperature control for solar heating  
M-FS-23775 878-10182 03  
Programmable controller for solar heating  
M-FS-23915 878-10183 03  
Power-switch dV/dt sensing  
MSC-16707 878-10307 01
- CONVECTIVE HEAT TRANSFER**  
Convectively cooled structures  
LANGLEY-12347 878-10404 06
- CONVEYORS**  
Automatic primate feeder  
LANGLEY-11586 878-10246 05
- COOLING**  
Modular heat-pipe-radiator panel  
MSC-16625 878-10328 03  
Convectively cooled structures  
LANGLEY-12347 878-10404 06  
Orbital heat rate package  
M-FS-23980 878-10554 06  
Localized cooling of electronic components  
LANGLEY-11955 878-10569 07
- COOLING SYSTEMS**  
Flat-plate heat pipe  
GSFC-11998 878-10035 03  
Thermal-control canister  
GSFC-12253 878-10079 06  
The economics of solar powered absorption cooling  
M-FS-23908 878-10214 03  
Application of solar energy to air-conditioning  
M-FS-23913 878-10215 03  
Protective coating for copper in aluminum heat exchangers  
M-FS-19334 878-10286 08  
Automated controller for liquid-cooled garments  
MSC-18055 878-10365 05  
Improved heat-pipe wick  
NPO-13391 878-10381 06
- COORDINATE TRANSFORMATIONS**  
Body-fitted coordinates systems transformations  
LANGLEY-12307 878-10147 09
- COORDINATES**  
Body-fitted coordinates systems transformations  
LANGLEY-12307 878-10147 09
- COPPER**  
Electroplating and stripping copper on molybdenum and niobium  
LEWIS-12151 878-10055 04  
Compatibility of Au-Cu-Ni braze alloy with NH<sub>3</sub>  
MSC-16864 878-10219 04  
Protective coating for copper in aluminum heat exchangers  
M-FS-19334 878-10286 08
- COPPER OXIDES**  
Absorptive coating for aluminum solar panels  
M-FS-25033 878-10507 04
- CORRECTION**  
Adaptive polarization separation experiments  
LANGLEY-12196 878-10006 01
- CORRELATION DETECTION**  
Digital correlator with fewer IC's  
MSC-16743 878-10458 01
- CORROSION**  
Corrosion inhibitors for solar heating and cooling systems  
M-FS-23892 878-10209 03  
Measuring metallic concentrations in glycol solutions  
M-FS-23894 878-10211 03  
Corrosion detection and evaluation  
M-FS-24436 878-10227 04  
Corrosion inhibitors for solar-heating and cooling  
M-FS-25023 878-10501 03
- CORROSION PREVENTION**  
Corrosion inhibitors for solar heating and cooling systems  
M-FS-23892 878-10209 03  
Improved alkali-metal/silicate binders  
GSFC-12303 878-10224 04

- Corrosion detection and evaluation  
M-FS-24436 B78-10227 04  
Embrittlement proof nickel-alloy bellows  
M-FS-19331 B78-10349 04  
Eliminating gold migration in microcircuits  
MSC-18213 B78-10462 01
- CORROSION RESISTANCE**  
Polyimide adhesives for titanium and composite bonding  
LANGLEY-12257 B78-10040 04  
Compatibility of Au-Cu-Ni braze alloy with NH3  
MSC-16864 B78-10219 04  
Wide-temperature corrosion-resistant pressure regulator  
NPO-13776 B78-10274 07
- CORROSION TESTS**  
Corrosion detection and evaluation  
M-FS-24436 B78-10227 04
- COST ANALYSIS**  
Handbook for estimating fabrication costs  
M-FS-23795 B78-10140 08  
The economics of solar powered absorption cooling  
M-FS-23908 B78-10214 03
- COST EFFECTIVENESS**  
Double-sided solar-cell package  
NPO-14199 B78-10033 03  
Laser wire stripping  
MSC-18000 B78-10118 08
- COST ESTIMATES**  
Price and cost estimation  
M-FS-23812 B78-10599 09
- COST REDUCTION**  
Telecommunications network optimization  
NPO-14486 B78-10476 02
- COSTS**  
Handbook for estimating fabrication costs  
M-FS-23795 B78-10140 08
- COUNTERS**  
Simple air-piston gas-sampling system  
LEWIS-12922 B78-10110 07  
Synchronous transfer circuits for redundant systems  
NPO-14162 B78-10157 01
- COUPLERS**  
Noncontact optical communication between moving stations  
LANGLEY-12283 B78-10377 06
- COUPLING CIRCUITS**  
Human arm may act as antenna  
ARC-11195 B78-10161 02
- COUPLINGS**  
Rigid coupling is also flexible  
MSC-16488 B78-10098 07  
Compact pressure-line coupling  
MSC-16893 B78-10099 07  
'Nonfloating' universal joint  
MSC-19546 B78-10108 07  
High-strength blind rivet  
LANGLEY-12154 B78-10287 08  
Coupler for moving vehicles  
GSFC-12322 B78-10407 07  
Insulator for cryogenic joints  
M-FS-19361 B78-10419 07  
Durable nonslip stainless-steel drivebelts  
GSFC-12276 B78-10567 07  
Two (or more) rotary outputs from one input  
MSC-19450 B78-10568 07
- COVERINGS**  
Fire-retardant covering for small containers  
ARC-11104 B78-10354 04
- CRACK PROPAGATION**  
Analysis of cracked orthotropic sheets  
LANGLEY-12288 B78-10405 06
- CRACKING (FRACTURING)**  
Gear-tooth fatigue-strength estimates  
MSC-18167 B78-10573 07
- CRACKS**  
Window flaw detection by backscatter lighting  
MSC-16605 B78-10089 06  
Electroplated 'cold patch' for critical parts  
M-FS-19401 B78-10584 08
- CRANIUM**  
Remotely-powered intracranial pressure monitor  
ARC-11120 B78-10362 05
- CROP GROWTH**  
Predicting crop production from satellite data  
GSFC-12379 B78-10595 09
- CROSSLINKING**  
Predicting structures of cross-linked condensation polymers  
NPO-14007 B78-10352 04
- CRUSTAL FRACTURES**  
Real-time monitoring of crustal deformations  
NPO-14124 B78-10034 03
- CRYOGENIC EQUIPMENT**  
Latching solenoid for cryogenic valves  
MSC-18106 B78-10418 07
- CRYOGENICS**  
Bonding Kovar pins to an alumina substrate  
MSC-16828 B78-10130 08  
Insulator for cryogenic joints  
M-FS-19361 B78-10419 07  
High-pressure cryogenic cylinder seal  
M-FS-19335 B78-10421 07
- CRYOSTATS**  
Cryostat safety tent  
GSFC-12206 B78-10080 06
- CRYSTAL GROWTH**  
Process for growing thin polished silicon sheets  
NPO-14172 B78-10434 08  
Controlling the growth of silicon sheets  
NPO-14295 B78-10581 08  
Automated control of crystal growth  
NPO-14420 B78-10582 08
- CRYSTAL OSCILLATORS**  
Multichannel VCO needs only one reference  
MSC-18225 B78-10448 01
- CRYSTAL SURFACES**  
Ruby c-axis alignment system  
NPO-14252 B78-10379 06
- CRYSTALS**  
Precision cleaver for 'soft' crystals  
GSFC-12291 B78-10348 04
- CUMULATIVE DAMAGE**  
Damage-detection system for LNG carriers  
LANGLEY-11463 B78-10250 06
- CURING**  
Cure-rate data for silicone adhesive  
GSFC-12330 B78-10057 04  
Fast-drying coating  
MSC-16056 B78-10060 04  
Match-mold process for foam insulation  
MSC-16631 B78-10126 08
- Void-free foam insulation  
MSC-16805 B78-10127 08  
High-rise foam-in-place process  
MSC-16931 B78-10128 08  
Predicting structures of cross-linked condensation polymers  
NPO-14007 B78-10352 04  
Breather cloth for vacuum curing  
MSC-18063 B78-10440 08
- CURRENT AMPLIFIERS**  
Improved driver for capacitive loads  
LANGLEY-11609 B78-10304 01
- CURRENT DENSITY**  
Electroplating and stripping copper on molybdenum and niobium  
LEWIS-12151 B78-10055 04
- CURRENT REGULATORS**  
Automatic load sharing in inverter modules  
NPO-14056 B78-10302 01  
Improved driver for capacitive loads  
LANGLEY-11609 B78-10304 01  
Overload protection system  
NPO-13872 B78-10460 01  
Load balancing multimodule switching power converters  
NPO-13832 B78-10461 01
- CURVE FITTING**  
Real-time instrument averages 100 data sets  
LEWIS-13093 B78-10534 06
- CUSHIONS**  
Air cushion landing system  
LANGLEY-12303 B78-10259 06  
Low-frequency vibration isolation  
NPO-13915 B78-10275 07
- CUTTERS**  
Tool simplifies weld preparation of aluminum  
MSC-16992 B78-10123 08  
Precision cleaver for 'soft' crystals  
GSFC-12291 B78-10348 04
- CUTTING**  
Laser wire stripping  
MSC-18000 B78-10118 08  
Contouring pile-brush seals  
MSC-16231 B78-10588 08
- CYCLES**  
Automated temperature-cycling apparatus  
LANGLEY-12310 B78-10391 06
- CYCLIC LOADS**  
Two (or more) rotary outputs from one input  
MSC-19450 B78-10568 07
- CYLINDRICAL CHAMBERS**  
Topping pressure for gas-storage cylinders  
MSC-18186 B78-10542 06
- CYLINDRICAL SHELLS**  
Self-centering stepped piston  
LEWIS-12997 B78-10101 07  
Wrench for thin-walled cylinders  
LANGLEY-12286 B78-10579 07
- CZOCHRALSKI METHOD**  
Process for growing thin polished silicon sheets  
NPO-14172 B78-10434 08

## D

- DAMAGE**  
Predicting damage from exploding vessels  
LEWIS-13042 B78-10258 06

# DAMPERS (VALVES)

Stable hydraulic pressure regulator  
LEWIS-13058 878-10417 07

# DAMPING

Low-frequency vibration isolation  
NPO-13915 878-10275 07

# DATA

Postprocessing classification images  
MSC-18238 878-10601 09

# DATA ACQUISITION

Chopper-stabilized phase detector  
MSC-16461 878-10163 02

Monitoring systems for community water supplies  
MSC-16778 878-10233 05

Data processing for water monitoring system  
MSC-16842 878-10234 05

Water sample-collection and distribution system  
MSC-16841 878-10235 05

28-Bit serial word simulator/monitor  
MSC-16418 878-10315 02

Electronically-scanned pressure measurement system  
LANGLEY-12386 878-10394 06

# DATA COMPRESSION

Simplified data compressor  
NPO-14041 878-10023 02

# DATA CONVERTERS

28-Bit serial word simulator/monitor  
MSC-16418 878-10315 02

# DATA CORRELATION

Digital correlator with fewer IC's  
MSC-16743 878-10458 01

# DATA LINKS

Noise tolerant computer link  
NPO-14152 878-10160 02

28-Bit serial word simulator/monitor  
MSC-16418 878-10315 02

# DATA PROCESSING

Interactive data-processing system for metallurgy  
M-FS-23774 878-10217 04

A parameter-estimation subroutine package  
NPO-14263 878-10447 09

Wideband digital spectrum analyzer  
NPO-14394 878-10468 02

Telecommunications network optimization  
NPO-14486 878-10476 02

# DATA PROCESSING EQUIPMENT

28-Bit serial word simulator/monitor  
MSC-16418 878-10315 02

Multipurpose system simulator  
GSFC-12333 878-10444 09

# DATA RECORDING

Portable data system  
ARC-11136 878-10316 02

Efficient digital encoding scheme  
MSC-18267 878-10467 02

# DATA REDUCTION

Infrared scanners for temperature measurement in wind tunnels  
LANGLEY-12171 878-10077 06

Data reformatting with less hardware  
NPO-13676 878-10470 02

# DATA STORAGE

Automatic radio-transmission monitor  
NPO-13941 878-10165 02

Water sample-collection and distribution system  
MSC-16841 878-10235 05

# DATA SYSTEMS

Accurate positioning of characters on CRT displays  
MSC-16505 878-10014 02

# DATA TRANSMISSION

Simplified data compressor  
NPO-14041 878-10023 02

Noise tolerant computer link  
NPO-14152 878-10160 02

Detecting and correcting bit errors on magnetic tape  
NPO-13842 878-10294 09

Implementing OQASK by using MSK  
NPO-13896 878-10309 01

28-Bit serial word simulator/monitor  
MSC-16418 878-10315 02

Noncontact optical communication between moving stations  
LANGLEY-12283 878-10377 06

Efficient digital encoding scheme  
MSC-18267 878-10467 02

# DECODING

Processing multispectral signals from a discrete-sensor array  
NPO-14211 878-10442 09

# DECOMMUTATORS

Data reformatting with less hardware  
NPO-13676 878-10470 02

# DECONTAMINATION

Self-sterilizing canister  
NPO-14237 878-10064 05

Biological sampling and cleaning device  
NPO-14010 878-10245 05

Coal desulfurization with iron pentacarbonyl  
NPO-14272 878-10342 04

Corona-discharge air-purification system  
ARC-10975 878-10350 04

Shock during PIND test frees particles  
M-FS-23829 878-10389 06

Accelerated purification of colloidal silica sols  
MSC-16793 878-10512 04

# DEEP SCATTERING LAYERS

Acoustic-optical imaging without immersion  
M-FS-23876 878-10549 06

# DEFLECTION

Combination force and angular-deflection indicator  
MSC-16155 878-10070 06

Noncontact measurement of angular deflection  
LANGLEY-12178 878-10071 06

Aircraft trailing vortex hazard alleviators  
LANGLEY-12034 878-10272 07

# DEFORMATION

Stress analysis under component relative interference fit  
LEWIS-12911 878-10261 06

Measuring surface displacements optically  
M-FS-23861 878-10321 03

No-warp potted circuits  
MSC-19729 878-10435 08

Elastic deformation of ball bearings, gears, and cams  
LEWIS-13076 878-10544 06

Detecting surface deformations photographically  
MSC-16156 878-10547 06

# DEGASSING

Deaerating high-viscosity silicon rubber  
MSC-16694 878-10514 04

# DEGRADATION

Corrosion detection and evaluation  
M-FS-24436 878-10227 04

# DEHUMIDIFICATION

Long-lasting solid-polymer electrolytic hygrometer  
NPO-13948 878-10086 06

# DEMODULATION

Automatic acquisition and ranging system  
NPO-13982 878-10312 02

# DEMODULATORS

Miniature Ku-Band down converter  
MSC-18313 878-10450 01

Simplified phase detector  
NPO-13395 878-10457 01

Narrow-bandwidth receiver  
GSFC-12142 878-10463 02

# DENDRITIC CRYSTALS

Eliminating gold migration in microcircuits  
MSC-18213 878-10462 01

# DEPOSITION

Ion-beam texturing of materials  
LEWIS-12996 878-10357 04

Control of dielectric film deposition  
LEWIS-13092 878-10430 08

# DEPTH MEASUREMENT

Ocean-wave ray or crest diagrams in shoaling waters  
LANGLEY-12380 878-10341 03

# DESIGN ANALYSIS

Performance optimizing  
LANGLEY-11930 878-10096 06

CMOS bulk-metal design handbook  
M-FS-23856 878-10142 08

Thermal performance of shaft bearing system  
LEWIS-12761 878-10263 06

CMOS-array design-automation techniques  
M-FS-23762 878-10311 01

Problems encountered in solar heating and cooling systems  
M-FS-23974 878-10331 03

Lines, bellows, flexible hoses, and filters  
LEWIS-13077 878-10424 07

# DESULFURIZING

Microbial desulfurization of coal  
NPO-14227 878-10038 04

Coal desulfurization with iron pentacarbonyl  
NPO-14272 878-10342 04

Low-temperature refining of coal  
NPO-14210 878-10511 04

# DETECTION

Thermal-leak analyzer for vacuum-jacketed lines  
MSC-16802 878-10085 06

Compact piston-position sensor  
LEWIS-12392 878-10102 07

Portable data system  
ARC-11136 878-10316 02

Modulation improves electro-optic object detector  
M-FS-23776 878-10380 06

Simplified phase detector  
NPO-13395 878-10457 01

System for monitoring lightning strikes  
KSC-11018 878-10475 02

Measurement of subcoat thickness by characteristic x-rays  
MSC-16718 878-10505 04

# DETONATION WAVES

Predicting damage from exploding vessels  
LEWIS-13042 878-10258 06

**DIAGNOSIS**

Automated tester for MOS devices  
NPO-14088 B78-10001 01

**DIALYSIS**

Positively charged membrane for urea dialysis  
NPO-14101 B78-10241 05

**DIAMETERS**

Calculating wire-bundle diameter  
MSC-16378 B78-10119 08

**DIAMINES**

Polyimide adhesives for titanium and composite bonding  
LANGLEY-12257 B78-10040 04

**DIAPHRAGMS (MECHANICS)**

High-temperature capacitive pressure transducer  
LEWIS-13078 B78-10398 06

**DIELECTRICS**

Control of dielectric film deposition  
LEWIS-13092 B78-10430 08

**DIES**

Form die and glide plates for vacuum brazing  
MSC-16549 B78-10113 08

**DIFFERENTIAL EQUATIONS**

Algorithms for linear-systems control  
LANGLEY-12313 B78-10443 09

**DIFFERENTIAL THERMAL ANALYSIS**

Thermal-leak analyzer for vacuum-jacketed lines  
MSC-16802 B78-10085 06

**DIFFRACTION**

Diffraction x-ray focusing  
GSFC-12357 B78-10487 03  
Measurement of subcoat thickness by characteristic x-rays  
MSC-16718 B78-10505 04

**DIGESTIVE SYSTEM**

Antihistamines reduce ulceration produced by indomethacin  
ARC-11118 B78-10366 05

**DIGITAL DATA**

Digital correlator with fewer IC's  
MSC-16743 B78-10458 01  
Efficient digital encoding scheme  
MSC-18267 B78-10467 02

**DIGITAL SIMULATION**

Electrolysis cell stimulation  
LEWIS-12740 B78-10179 03  
Marshall system for aerospace simulation  
M-FS-22672 B78-10296 09

**DIGITAL TECHNIQUES**

Wideband digital spectrum analyzer  
NPO-14394 B78-10468 02  
Eliminating ambiguity in digital signals  
NPO-14289 B78-10469 02  
Data reformatting with less hardware  
NPO-13676 B78-10470 02  
Hybrid heart/breath-rate processor  
MSC-18227 B78-10528 05

**DIGITAL TO ANALOG CONVERTERS**

Fast differential analog-to-digital conversion  
LEWIS-12909 B78-10149 01

**DILUTION**

Automated electrochemical selection of coliforms  
MSC-16777 B78-10236 05

**DIMENSIONAL STABILITY**

Abrasion-resistant antireflective coating for polycarbonate  
ARC-11047 B78-10054 04

**DIODES**

Precise matching of diodes  
NPO-14293 B78-10452 01

**DIPLOLE ANTENNAS**

Efficient rectifying antenna  
NPO-13884 B78-10471 02

**DIPPING**

Dip-molded t-shaped cannula  
NPO-14073 B78-10062 05

**DIRECTIONAL ANTENNAS**

Compact antenna has symmetrical radiation pattern  
ARC-11189 B78-10473 02

**DIRECTIVITY**

Directional laser velocimeter with doppler velocity simulator  
LANGLEY-12176 B78-10029 03

**DISCONNECT DEVICES**

Preventing radio-paging system tieup  
MSC-19696 B78-10024 02  
Compact pressure-line coupling  
MSC-16893 B78-10099 07  
Automatic circuit interrupter  
MSC-16697 B78-10300 01  
Easily-wired toggle switch  
MSC-18102 B78-10301 01  
Miniature thermocouple disconnect  
LANGLEY-12013 B78-10535 06

**DISPENSERS**

Automatic primate feeder  
LANGLEY-11586 B78-10246 05

**DISPLACEMENT**

Analysis of beam columns  
MSC-18009 B78-10402 06

**DISPLACEMENT MEASUREMENT**

Measuring surface displacements optically  
M-FS-23861 B78-10321 03

**DISPLAY DEVICES**

Accurate positioning of characters on CRT displays  
MSC-16505 B78-10014 02  
'Space slitter' for film or tape  
KSC-10894 B78-10138 08  
Water sample-collection and distribution system  
MSC-16841 B78-10235 05  
Plotting shear-flow forces  
MSC-18013 B78-10445 09  
Hybrid LCD driver  
MSC-18229 B78-10529 05

**DISSOLVING**

Electroplating and stripping copper on molybdenum and niobium  
LEWIS-12151 B78-10055 04

**DISTANCE MEASURING EQUIPMENT**

Optical traffic-sensing concept  
NPO-13603 B78-10021 02

**DISTRIBUTION**

Water sample-collection and distribution system  
MSC-16841 B78-10235 05

**DOCUMENTATION**

Medical Information Management System  
GSFC-12078 B78-10376 05

**DOORS**

Combined hinge and latch  
MSC-19602 B78-10572 07

**DOSIMETERS**

Stacked solar cells measure X-ray exposure  
NPO-13954 B78-10243 05

**DOWNTIME**

Computation of spare parts requirements  
MSC-16872 B78-10593 09

**DOWNWASH**

WAKE and WASH  
LANGLEY-12262 B78-10093 06

**DRAG**

Flicking-wire drag tensioner  
MSC-16367 B78-10109 07  
Nacelle incremental drag  
LEWIS-12786 B78-10400 06  
Wing aerodynamics under blowing jets  
LANGLEY-12256 B78-10401 06

**DRAG REDUCTION**

Aerodynamic design lowers truck fuel consumption  
FRC-11015 B78-10069 06

**DRILLING**

Pulse-echo probe of rock permeability near oil wells  
NPO-14192 B78-10222 04

**DRUGS**

Antihistamines reduce ulceration produced by indomethacin  
ARC-11118 B78-10366 05

**DRY CELLS**

Continuous process fabricates battery plaque  
GSFC-12054 B78-10132 08

**DUCTED BODIES**

Flow in axisymmetric ducts with struts  
LEWIS-12798 B78-10556 06

**DUCTILITY**

Low-chromium stainless steels  
LEWIS-12543 B78-10046 04

**DUCTS**

Flow velocities and streamlines  
LEWIS-12966 B78-10094 06

**DUST**

Shock during PIND test frees particles  
M-FS-23829 B78-10389 06

**DYES**

Fluorescent paint simplifies laser-beam alignment  
LEWIS-12571 B78-10030 03  
Portable fluorescent-dye inspection device  
M-FS-24019 B78-10139 08  
High-pressure liquid chromatography of aromatic amines  
LANGLEY-12163 B78-10515 04

**DYNAMIC PROGRAMMING**

Hydraulic dynamic analysis  
MSC-16795 B78-10095 06

**DYNAMIC RESPONSE**

Compact piston-position sensor  
LEWIS-12392 B78-10102 07

**E****EAR**

Implantable digital hearing aid  
KSC-11009 B78-10373 05

**EARTH CRUST**

Real-time monitoring of crustal deformations  
NPO-14124 B78-10034 03

**EARTH RESOURCES**

Multiple-input land-use system concept  
NPO-13903 B78-10018 02

Multidimensional histograms  
M-FS-23855 B78-10503 03

**EARTH RESOURCES INFORMATION SYSTEM**

Multiple-input land-use system concept  
NPO-13903 B78-10018 02

**EARTHQUAKES**

Real-time monitoring of crustal deformations  
NPO-14124 B78-10034 03

**ECCENTRICITY**

Self-centering stepped piston  
LEWIS-12997 B78-10101 07

**ECONOMIC ANALYSIS**

Handbook for estimating fabrication costs  
M-FS-23795 B78-10140 08  
The economics of solar powered absorption cooling  
M-FS-23908 B78-10214 03

**EFFICIENCY**

Gate-assisted turn-off thyristor  
LEWIS-12535 B78-10004 01  
Pump efficiency in solar-energy systems  
M-FS-23934 B78-10213 03  
Power loss for high-voltage solar-cell arrays  
LEWIS-12865 B78-10340 03

**EFFLUENTS**

Water sample-collection and distribution system  
MSC-16841 B78-10235 05

**EIGENVALUES**

Algorithms for linear-systems control  
LANGLEY-12313 B78-10443 09

**EIGENVECTORS**

Algorithms for linear-systems control  
LANGLEY-12313 B78-10443 09

**ELASTIC DEFORMATION**

Elastic deformation of ball bearings, gears, and cams  
LEWIS-13076 B78-10544 06

**ELASTIC PROPERTIES**

Analysis of linear viscoelastic structures  
NPO-13197 B78-10266 06  
Measuring poisson's ratio in elastomers  
M-FS-23878 B78-10387 06  
Analysis of cracked orthotropic sheets  
LANGLEY-12288 B78-10405 06

**ELASTOMERS**

Fire-and smoke-retardant polyesters and elastomers  
NPO-14053 B78-10058 04  
Low-temperature elastomer production and curing  
NPO-13899 B78-10346 04  
Predicting structures of cross-linked condensation polymers  
NPO-14007 B78-10352 04  
resterilizable electrode for electrosurgery  
HQN-10915 B78-10370 05  
Measuring poisson's ratio in elastomers  
M-FS-23878 B78-10387 06

**ELASTOMETERS**

Reducing stickiness of elastomer valve seals  
LANGLEY-11778 B78-10565 07

**ELECTRIC ARCS**

Arc detector uses fiber optics  
NPO-13377 B78-10449 01  
Low partial discharge vacuum feedthrough  
GSFC-12347 B78-10559 07

**ELECTRIC BATTERIES**

Multiplexed battery-bypass control system  
NPO-14414 B78-10474 02

**ELECTRIC BRIDGES**

Improved strain-gage calibration  
MSC-16852 B78-10074 06

**ELECTRIC CHOPPERS**

Chopper-stabilized phase detector  
MSC-16461 B78-10163 02

**ELECTRIC CONNECTORS**

Coaxial isolator has versatile interface  
MSC-16908 B78-10009 01  
Flicking-wire drag tensioner  
MSC-16367 B78-10109 07  
Automatic circuit interrupter  
MSC-16697 B78-10300 01  
Easily-wired toggle switch  
MSC-18102 B78-10301 01  
Circuit-lead trimming template  
MSC-16589 B78-10439 08  
Modular ground-wire connector  
MSC-16633 B78-10454 01

**ELECTRIC CORONA**

Ultrasonic evaluation of high-voltage circuit boards  
LEWIS-12781 B78-10087 06

**ELECTRIC DISCHARGES**

Corona-discharge air-purification system  
ARC-10975 B78-10350 04  
Economical synthesis of potassium superoxide  
ARC-10992 B78-10353 04

**ELECTRIC FUSES**

Fuseholders allow fast system checkout  
MSC-16856 B78-10088 06

**ELECTRIC GENERATORS**

Wind-wheel electric power generator  
M-FS-23515 B78-10268 07  
Hall devices improve electric motor efficiency  
M-FS-23828 B78-10303 01  
Terrestrial photovoltaic measurements  
LEWIS-13057 B78-10310 01  
Power loss for high-voltage solar-cell arrays  
LEWIS-12865 B78-10340 03  
Photovoltaic systems test facility  
LEWIS-13073 B78-10378 06  
Wind/water energy converter  
GSFC-12361 B78-10483 03

**ELECTRIC MOTORS**

Three-phase induction motors  
MSC-16904 B78-10281 07  
High-Speed, high-power, switching transistor  
LEWIS-13021 B78-10298 01  
Hall devices improve electric motor efficiency  
M-FS-23828 B78-10303 01  
Dynamic braking of bidirectional motors  
ARC-11194 B78-10578 07

**ELECTRIC NETWORKS**

Phase-shift array, arbitrary and continuous through 360 deg  
LANGLEY-12272 B78-10308 01

**ELECTRIC POWER PLANTS**

Energy conversion alternatives study  
LEWIS-13096 B78-10330 03  
Ocean thermal plant  
KSC-11034 B78-10482 03

**ELECTRIC POWER SUPPLIES**

Load balancing multimodule switching power converters  
NPO-13832 B78-10461 01

**ELECTRIC POWER TRANSMISSION**

Power-switch dV/dt sensing  
MSC-16707 B78-10307 01

**ELECTRIC PROPULSION**

Electric and hybrid vehicles  
LEWIS-13077 B78-10423 07

**ELECTRIC PULSES**

Simple digital pulse-programing circuit  
NPO-13747 B78-10299 01

**ELECTRIC RELAYS**

Automatic circuit interrupter  
MSC-16697 B78-10300 01

Latching solenoid for cryogenic valves  
MSC-18106 B78-10418 07

**ELECTRIC SWITCHES**

High-power RF switch  
NPO-14229 B78-10151 01  
IC implementation of crossbar switches  
NPO-13837 B78-10153 01  
Easily-wired toggle switch  
MSC-18102 B78-10301 01

**ELECTRIC WELDING**

Improved electron-beam welder  
M-FS-23772 B78-10143 08  
Welding fixture for thin metal parts  
GSFC-12318 B78-10428 08  
Detecting overpenetration of electron-beam welds  
M-FS-19396 B78-10586 08

**ELECTRIC WIRE**

Flicking-wire drag tensioner  
MSC-16367 B78-10109 07  
Calculating wire-bundle diameter  
MSC-16378 B78-10119 08  
Wire selector/calculator  
MSC-16632 B78-10120 08  
Easily-wired toggle switch  
MSC-18102 B78-10301 01  
Modular ground-wire connector  
MSC-16633 B78-10454 01

**ELECTRICAL GROUNDING**

Electrical-ground monitor  
MSC-18281 B78-10455 01

**ELECTRICAL INSULATION**

Wire selector/calculator  
MSC-16632 B78-10120 08

**ELECTRO-OPTICS**

Improved 'spectrophone'  
NPO-14143 B78-10167 03  
Modulation improves electro-optic object detector  
M-FS-23776 B78-10380 06  
Instrument measures many optical properties in visible and IR  
LANGLEY-12285 B78-10489 03  
Automated electrophoresis apparatus  
M-FS-23983 B78-10516 04

**ELECTROACOUSTIC TRANSDUCERS**

Ultrasonic evaluation of high-voltage circuit boards  
LEWIS-12781 B78-10087 06

**ELECTROCARDIOGRAPHY**

Hybrid ECG signal conditioner  
MSC-18230 B78-10526 05  
Hybrid respiration-signal conditioner  
MSC-18226 B78-10527 05  
Noncontacting electrokinetography system  
MSC-18162 B78-10533 05

**ELECTROCHEMISTRY**

Automated electrochemical selection of coliforms  
MSC-16777 B78-10236 05

**ELECTRODELESS DISCHARGES**

System for monitoring lightning strikes  
KSC-11018 B78-10475 02

**ELECTRODES**

resterilizable electrode for electrosurgery  
HQN-10915 B78-10370 05  
Ion-beam-textured graphite  
LEWIS-12724 B78-10506 04

**ELECTROLYSIS**

Measurement of total organic concentration in water  
MSC-16497 B78-10048 04  
Electrolysis cell stimulation  
LEWIS-12740 B78-10179 03

**ELECTROLYTIC CELLS**

Long-lasting solid-polymer electrolytic hygrometer  
NPO-13948 878-10086 06  
Electrolysis cell stimulation  
LEWIS-12740 878-10179 03

**ELECTROMAGNETIC ABSORPTION**

Selection standard for FEP films for solar energy  
MSC-16999 878-10190 03  
Ultrathin films as photomechanical transducer  
NPO-14363 878-10491 03

**ELECTROMAGNETIC INTERFERENCE**

Finding radiant-energy sources  
GSFC-12147 878-10159 02

**ELECTROMAGNETIC NOISE**

Finding radiant-energy sources  
GSFC-12147 878-10159 02

**ELECTROMAGNETIC RADIATION**

Finding radiant-energy sources  
GSFC-12147 878-10159 02

**ELECTROMETERS**

Automated tester for MOS devices  
NPO-14088 878-10001 01

**ELECTROMYOGRAPHY**

Wideband EMG telemetry system  
ARC-11209 878-10375 05

**ELECTRON BEAM WELDING**

Laser beam assists in precision welding  
M-FS-19319 878-10122 08  
Improved electron-beam welder  
M-FS-23772 878-10143 08  
Detecting overpenetration of electron-beam welds  
M-FS-19396 878-10586 08

**ELECTRON BEAMS**

Improved electron-beam probe for hypersonic flows  
NPO-13793 878-10254 06

**ELECTRON EMISSION**

Ion-beam-textured graphite  
LEWIS-12724 878-10506 04

**ELECTRON MICROSCOPES**

SEM probe of IC radiation sensitivity  
NPO-14350 878-10541 06

**ELECTRONIC CONTROL**

Programmable controller for solar heating  
M-FS-23915 878-10183 03  
Simple digital pulse-programming circuit  
NPO-13747 878-10299 01  
Automatic load sharing in inverter modules  
NPO-14056 878-10302 01

**ELECTRONIC EQUIPMENT TESTS**

Automated tester for MOS devices  
NPO-14088 878-10001 01  
Measuring oxide trapping parameters in MOS structure  
NPO-14120 878-10002 01  
Reclaiming hybrid integrated circuits  
MSC-16463 878-10129 08  
Strobe-margin test for plated memory systems  
M-FS-23838 878-10154 01  
Universal test fixture for solar cells  
NPO-14062 878-10184 03  
Testing integrated circuits by photoexcitation  
M-FS-23943 878-10451 01  
Precise matching of diodes  
NPO-14293 878-10452 01  
SEM probe of IC radiation sensitivity  
NPO-14350 878-10541 06  
Sealing microcircuits with adhesives  
M-FS-23869 878-10592 08

**ELECTRONIC FILTERS**

A parameter-estimation subroutine package  
NPO-14263 878-10447 09  
Efficient rectifying antenna  
NPO-13884 878-10471 02

**ELECTRONIC MODULES**

S-Band complex-weight module for adaptive processing  
LANGLEY-12197 878-10005 01  
Approach and landing simulation  
LANGLEY-12060 878-10091 06  
Safe venting for electronic components  
MSC-18007 878-10155 01  
Synchronous transfer circuits for redundant systems  
NPO-14162 878-10157 01  
Automatic load sharing in inverter modules  
NPO-14056 878-10302 01  
Modular ground-wire connector  
MSC-16633 878-10454 01  
Load balancing multimodule switching power converters  
NPO-13832 878-10461 01

**ELECTRONIC PACKAGING**

Reclaiming hybrid integrated circuits  
MSC-16463 878-10129 08  
Safe venting for electronic components  
MSC-18007 878-10155 01  
Microcircuit-cleaning machine  
MSC-16060 878-10292 08  
Multiple-sample holder for IC testing  
NPO-14314 878-10540 06  
Accelerated hybrid-circuit production  
MSC-18272 878-10585 08  
Sealing microcircuits with adhesives  
M-FS-23869 878-10592 08

**ELECTRONIC TRANSDUCERS**

Noncontacting electrokinetography system  
MSC-18162 878-10533 05  
'Blind' position indicator  
MSC-16972 878-10570 07

**ELECTROPHORESIS**

Improvements in microelectrophoresis apparatus  
ARC-11121 878-10247 05  
Automated electrophoresis apparatus  
M-FS-23983 878-10516 04  
Separating biological cells  
M-FS-23883 878-10521 05

**ELECTROPHOTOMETERS**

Measurement of total organic concentration in water  
MSC-16497 878-10048 04

**ELECTROPLATING**

Electroplating and stripping copper on molybdenum and niobium  
LEWIS-12151 878-10055 04  
Electroplated 'cold patch' for critical parts  
M-FS-19401 878-10584 08

**ELECTROSTATIC CHARGE**

Antistatic additive for polyimide films  
NPO-14232 878-10220 04  
Antistatic coating for acrylics  
NPO-13867 878-10509 04

**ELECTROSTATICS**

Portable spark-gap arc generator  
LEWIS-12886 878-10008 01

**ELLIPSOMETERS**

Instrument measures many optical properties in visible and IR  
LANGLEY-12285 878-10489 03

**EMBRITTLMENT**

Embrittlement proof nickel-alloy bellows  
M-FS-19331 878-10349 04

**EMERGENCY LIFE SUSTAINING SYSTEMS**

Hybrid respiration-signal conditioner  
MSC-18226 878-10527 05

**EMISSION**

Ion-beam texturing of materials  
LEWIS-12996 878-10357 04

**EMULSIONS**

Flame-retardant adhesive tape  
MSC-16721 878-10041 04

**ENCAPSULATING**

Reclaiming hybrid integrated circuits  
MSC-16463 878-10129 08  
Zone-refining encapsulated semiconductors  
M-FS-23902 878-10351 04  
Sealing microcircuits with adhesives  
M-FS-23869 878-10592 08

**ENCLOSURES**

Safe venting for electronic components  
MSC-18007 878-10155 01

**ENDOSCOPES**

Improved probe for rectal-cancer detection  
NPO-14247 878-10531 05

**ENERGY ABSORPTION**

Hot-air flat-plate solar collector-design package  
M-FS-23941 878-10335 03

**ENERGY ABSORPTION FILMS**

Selection standard for FEP films for solar energy  
MSC-16999 878-10190 03  
Natural-oxide solar-collector coatings  
M-FS-23518 878-10326 03

**ENERGY CONSERVATION**

Energy conservation, using remote thermal scanning  
LEWIS-12812 878-10178 03  
Optics for natural lighting  
LANGLEY-12333 878-10189 03  
Infrared scanners detect thermal gradients in building walls  
LANGLEY-12157 878-10480 03

**ENERGY CONSUMPTION**

Electric and hybrid vehicles  
LEWIS-13077 878-10423 07

**ENERGY CONVERSION**

Energy conversion alternatives study  
LEWIS-13096 878-10330 03  
Ocean thermal plant  
KSC-11034 878-10482 03  
Wind/water energy converter  
GSFC-12361 878-10483 03

**ENERGY CONVERSION EFFICIENCY**

Electrolysis cell stimulation  
LEWIS-12740 878-10179 03  
Hall devices improve electric motor efficiency  
M-FS-23828 878-10303 01  
Stirling-engine design manual  
LEWIS-13098 878-10580 07

**ENERGY DISSIPATION**

Energy conservation, using remote thermal scanning  
LEWIS-12812 878-10178 03

**ENERGY STORAGE**

Glass tubes for protecting solar cells  
NPO-14200 878-10031 03

**ENERGY TECHNOLOGY**

The economics of solar powered absorption cooling  
M-FS-23908 878-10214 03

- Application of solar energy to air-conditioning  
M-FS-23913 878-10215 03
- Wind-wheel electric power generator  
M-FS-23515 878-10268 07
- Solar-powered hot-water system  
NPO-14270 878-10324 03
- Solar-powered hot-air system  
M-FS-23976 878-10481 03
- Solar-heating system  
M-FS-25022 878-10494 03
- Residential solar-heating system-design package  
M-FS-25071 878-10496 03
- Development and testing of a hot-air solar collector  
M-FS-23997 878-10497 03
- Liquid solar collector-performance tests  
M-FS-25082 878-10499 03
- Low-temperature refining of coal  
NPO-14210 878-10511 04
- ENGINE DESIGN**  
Simpler valve for reciprocating engines  
MSC-16239 878-10276 07
- Stirling-engine design manual  
LEWIS-13098 878-10580 07
- ENGINE INLETS**  
Flow in axisymmetric ducts with struts  
LEWIS-12798 878-10556 06
- ENGINE PARTS**  
Self-centering stepped piston  
LEWIS-12997 878-10101 07
- Portable fluorescent-dye inspection device  
M-FS-24019 878-10139 08
- Edge geometry of turbomachine blades  
LEWIS-12979 878-10262 06
- Simpler valve for reciprocating engines  
MSC-16239 878-10276 07
- ENGINE TESTS**  
Real-time instrument averages 100 data sets  
LEWIS-13093 878-10534 06
- ENGINEERING DRAWINGS**  
Hot-air flat-plate solar collector-design package  
M-FS-23941 878-10335 03
- ENGINES**  
Electric and hybrid vehicles  
LEWIS-13077 878-10423 07
- ENVIRONMENT MODELS**  
Fabrication of sea-floor models  
NPO-13554 878-10295 09
- ENVIRONMENT POLLUTION**  
Electric and hybrid vehicles  
LEWIS-13077 878-10423 07
- ENVIRONMENT SIMULATORS**  
Accelerated-weathering test-system for solar cells  
NPO-14061 878-10185 03
- ENVIRONMENTAL CONTROL**  
Adjustable gas-flow restrictor  
MSC-19486 878-10560 07
- ENVIRONMENTAL QUALITY**  
Automated syringe sampler  
LANGLEY-12308 878-10374 05
- Compact turbidity meter  
KSC-11063 878-10545 06
- ENVIRONMENTAL TESTS**  
Universal test fixture for solar cells  
NPO-14062 878-10184 03
- Accelerated-weathering test-system for solar cells  
NPO-14061 878-10185 03
- Instrument measures many optical properties in visible and IR  
LANGLEY-12285 878-10489 03
- Sealing microcircuits with adhesives  
M-FS-23869 878-10592 08
- ENVIRONMENTS**  
Ultrasonic evaluation of high-voltage circuit boards  
LEWIS-12781 878-10087 06
- ENZYMES**  
Bacillus cereus strain MCN as a debriding agent  
LANGLEY-12287 878-10067 05
- EPOXY COMPOUNDS**  
New adhesive withstands temperature extremes  
GSFC-12345 878-10042 04
- Effects of moisture on graphite/epoxy composites  
MSC-18045 878-10360 04
- EPOXY RESINS**  
New adhesive withstands temperature extremes  
GSFC-12345 878-10042 04
- Match-mold process for foam insulation  
MSC-16631 878-10126 08
- Fire-retardant epoxy polymers  
ARC-11182 878-10218 04
- Improved epoxy adhesive with radiographic tracer  
MSC-18020 878-10225 04
- Response of graphite/epoxy composites to moisture  
MSC-16899 878-10228 04
- Vacuum leadthrough for hydrogen maser  
NPO-14148 878-10422 07
- Low-cost graphite/epoxy structural panels  
M-FS-23871 878-10427 08
- EQUILIBRIUM EQUATIONS**  
Analysis of linear viscoelastic structures  
NPO-13197 878-10266 06
- EQUIPMENT SPECIFICATIONS**  
Improved electron-beam welder  
M-FS-23772 878-10143 08
- Precise matching of diodes  
NPO-14293 878-10452 01
- ERROR CORRECTING DEVICES**  
Verification of redundancy management design  
MSC-16713 878-10145 09
- Model for redundant-sensor signal errors  
MSC-16715 878-10146 09
- Detecting and correcting bit errors on magnetic tape  
NPO-13842 878-10294 09
- ERROR DETECTION CODES**  
Digital correlator with fewer IC's  
MSC-16743 878-10458 01
- ESCAPE SYSTEMS**  
Emergency escape device  
M-FS-23235 878-10270 07
- ESTIMATING**  
Handbook for estimating fabrication costs  
M-FS-23795 878-10140 08
- A parameter-estimation subroutine package  
NPO-14263 878-10447 09
- ETCHANTS**  
Thin silicon-solar cell fabrication  
NPO-14047 878-10325 03
- ETCHING**  
Thin silicon-solar cell fabrication  
NPO-14047 878-10325 03
- EUTECTIC ALLOYS**  
High-gradient continuous-casting furnace  
LEWIS-12934 878-10425 08
- EVACUATING (VACUUM)**  
Internal grid for release of brazing retorts  
MSC-19472 878-10114 08
- EXHAUST GASES**  
Modified chemiluminescent NO analyzer accurately measures NOX  
LEWIS-12850 878-10047 04
- Oxygen and nitrogen raman spectra  
LEWIS-12849 878-10361 04
- EXOTHERMIC REACTIONS**  
Low-cost high purity production  
NPO-14198 878-10050 04
- EXPANDABLE STRUCTURES**  
Collapsible module extends tenfold in height  
NPO-13371 878-10280 07
- EXPLOSIONS**  
Predicting damage from exploding vessels  
LEWIS-13042 878-10258 06
- Simulator for training remote-manipulator operators  
MSC-14921 878-10415 07
- EXPOSURE**  
Improved control of medical x-ray film exposure  
NPO-13808 878-10063 05
- EXTENSIONS**  
Modified pipe extension safely releases chain binders  
MSC-16937 878-10103 07
- Extension handle for spray cans  
KSC-11083 878-10576 07
- EXTENSOMETERS**  
Ultrasonic extensometer measures bolt preload  
M-FS-19337 878-10271 07
- EXTINGUISHING**  
Penetrating fire extinguisher  
KSC-11064 878-10397 06
- EXTRACTION**  
Simple tool removes IC flat packs  
MSC-16058 878-10010 01
- Drag-pump rotating filter  
MSC-16180 878-10563 07
- Compact bypass-flow filter  
MSC-18311 878-10564 07
- EYE DISEASES**  
Intraocular pressure reduction and regulation  
LEWIS-12723 878-10523 05

## F

## FABRICATION

- 'PC fabrication' for silicon solar-cell arrays  
NPO-13991 878-10131 08
- Handbook for estimating fabrication costs  
M-FS-23795 878-10140 08
- FABRICS**  
Special weave for insulating fabrics  
MSC-16380 878-10288 08
- FAILURE ANALYSIS**  
Curve tracer checks CMOS IC's  
GSFC-12209 878-10007 01
- Glass solar collector - materials assessment  
M-FS-23926 878-10212 03

**FAILURE MODES**

Glass solar collector - materials assessment  
M-FS-23926 B78-10212 03  
Detecting servo failures with software  
FRC-11003 B78-10396 06

**FAR FIELDS**

Noise calculation on the basis of vortex flow models  
LANGLEY-12271 B78-10078 06

**FARM CROPS**

Predicting crop production from satellite data  
GSFC-12379 B78-10595 09

**FAST FOURIER TRANSFORMATIONS**

Wideband digital spectrum analyzer  
NPO-14394 B78-10468 02

**FASTENERS**

Ultrasonic extensometer measures bolt preload  
M-FS-19337 B78-10271 07  
High-strength blind rivet  
LANGLEY-12154 B78-10287 08  
Quick locking/unlocking retainer  
MSC-18048 B78-10408 07  
Antibackoff lock for nuts and bolts  
MSC-16472 B78-10409 07  
Fastener for thin fragile materials  
MSC-18097 B78-10436 08  
Fastener for thermal insulation blankets  
MSC-18253 B78-10571 07  
Combined hinge and latch  
MSC-19602 B78-10572 07  
Bend-absorbing clamp  
MSC-16971 B78-10575 07

**FATIGUE (MATERIALS)**

Gear-tooth fatigue-strength estimates  
MSC-18167 B78-10573 07

**FEED SYSTEMS**

Low partial discharge vacuum feedthrough  
GSFC-12347 B78-10559 07

**FEEDBACK**

Noncontact measurement of angular deflection  
LANGLEY-12178 B78-10071 06

**FEEDBACK CIRCUITS**

Thermal compensator for helium refrigerators  
GSFC-12168 B78-10082 06  
Symmetric voltage-controlled variable resistance  
MSC-16685 B78-10148 01

**FEEDBACK CONTROL**

Improved servocontrol system  
M-FS-19358 B78-10150 01  
Automatic load sharing in inverter modules  
NPO-14056 B78-10302 01  
Z-axis control loop for cathode-ray tubes  
NPO-13775 B78-10305 01  
Shaft speed control  
NPO-14170 B78-10416 07  
Improved servo for a michaelson interferometer  
NPO-14093 B78-10488 03

**FEEDERS**

Automatic primate feeder  
LANGLEY-11586 B78-10246 05

**FELTS**

Coated-felt thermal insulation  
MSC-12737 B78-10510 04

**FERRITES**

Temperature stabilization of microwave ferrite devices  
MSC-16833 B78-10152 01

**FERROELECTRICITY**

One-third selection for matrix-addressing ferroelectrics  
LANGLEY-11993 B78-10456 01

**FIBER OPTICS**

Signal-interleaving device  
GSFC-12111 B78-10319 03

**FIBER ORIENTATION**

Friction of thick laminates  
LANGLEY-12010 B78-10284 08

**FIBERS**

Installing fiber insulation in tight spaces  
MSC-16934 B78-10289 08  
Ultrafine PBI fibers and yarns  
ARC-11221 B78-10504 04  
Contouring pile-brush seals  
MSC-16231 B78-10588 08

**FIELD EFFECT TRANSISTORS**

Symmetric voltage-controlled variable resistance  
MSC-16685 B78-10148 01

**FILLERS**

Fire-and smoke-retardant polyesters and elastomers  
NPO-14053 B78-10058 04  
Fire-resistant wood composites  
ARC-11174 B78-10508 04

**FILLING**

Topping pressure for gas-storage cylinders  
MSC-18186 B78-10542 06

**FILM THICKNESS**

Applying uniform adhesive coatings  
MSC-19462 B78-10583 08

**FINANCIAL MANAGEMENT**

Handbook for estimating fabrication costs  
M-FS-23795 B78-10140 08  
Price and cost estimation  
M-FS-23812 B78-10599 09

**FINISHES**

Repairing silicon carbide coatings  
MSC-18033 B78-10226 04

**FINITE ELEMENT METHOD**

Structural performance analysis and redesign  
LANGLEY-12213 B78-10264 06  
Convectively cooled structures  
LANGLEY-12347 B78-10404 06  
Analysis of cracked orthotropic sheets  
LANGLEY-12288 B78-10405 06  
Plotting max/min data envelopes  
MSC-18016 B78-10597 09

**FIRE DAMAGE**

Fire-retardant covering for small containers  
ARC-11104 B78-10354 04

**FIRE EXTINGUISHERS**

Penetrating fire extinguisher  
KSC-11064 B78-10397 06

**FIRE PREVENTION**

Fire-retardant foams  
MSC-16222 B78-10053 04  
Infrared-enhanced TV for fire detection  
M-FS-19380 B78-10172 03  
Fire-retardant covering for small containers  
ARC-11104 B78-10354 04  
Fire-retardant lightweight composite  
ARC-10918 B78-10355 04  
Heat resistant nontoxic laminate  
ARC-11040 B78-10356 04  
Toxic substances handbook  
LEWIS-13124 B78-10359 04  
Directory of fire research specialists  
LEWIS-13123 B78-10399 06

Fire-resistant wood composites

ARC-11174 B78-10508 04

**FIREPROOFING**

Fire-retardant foams  
MSC-16222 B78-10053 04  
Match-mold process for foam insulation  
MSC-16631 B78-10126 08  
Fire-retardant covering for small containers  
ARC-11104 B78-10354 04  
Fire-retardant lightweight composite  
ARC-10918 B78-10355 04

**FIRST AID**

Toxic substances handbook  
LEWIS-13124 B78-10359 04  
Directory of fire research specialists  
LEWIS-13123 B78-10399 06

**FITTING**

Reducing weld peaking in aluminum  
M-FS-23973 B78-10433 08  
'Blind' position indicator  
MSC-16972 B78-10570 07

**FITTINGS**

Compact pressure-line coupling  
MSC-16893 B78-10099 07  
Fastener for thin fragile materials  
MSC-18097 B78-10436 08  
Easily installed insulation for steamfittings  
MSC-18277 B78-10589 08

**FIXTURES**

Welding fixture for thin metal parts  
GSFC-12318 B78-10428 08  
Holding fixture for variable-contour parts  
MSC-16270 B78-10429 08  
'Gentle' holder for brittle ceramics  
MSC-19645 B78-10552 06  
Wrench for thin-walled cylinders  
LANGLEY-12286 B78-10579 07

**FLAME PROPAGATION**

Fire-resistant wood composites  
ARC-11174 B78-10508 04

**FLAME RETARDANTS**

Flame-retardant adhesive tape  
MSC-16721 B78-10041 04  
Fire-retardant foams  
MSC-16222 B78-10053 04  
Fire-and smoke-retardant polyesters and elastomers  
NPO-14053 B78-10058 04  
Improved imide polymerization catalyst  
ARC-11107 B78-10517 04

**FLAMMABILITY**

Compression testing of flammable liquids  
MSC-16121 B78-10548 06

**FLAMMABLE GASES**

Cryostat safety tent  
GSFC-12206 B78-10080 06

**FLAT PLATES**

Flat-plate heat pipe  
GSFC-11998 B78-10035 03  
Process fabricates flat panels at high temperatures  
MSC-16969 B78-10116 08  
Flat-plate liquid solar collector  
M-FS-23912 B78-10205 03

**FLATNESS**

Process fabricates flat panels at high temperatures  
MSC-16969 B78-10116 08

**FLEXIBILITY**

Stability characteristics of elastic airplane  
ARC-11144 B78-10092 06



Lines, bellows, flexible hoses, and filters  
LEWIS-13077 878-10424 07

**FLEXING**  
Artificial leg with natural gait  
M-FS-23225 878-10239 05

**FLIP-FLOPS**  
Synchronous transfer circuits for redundant systems  
NPO-14162 878-10157 01  
Signal-interleaving device  
GSFC-12111 878-10319 03

**FLOW DISTRIBUTION**  
Noise calculation on the basis of vortex flow models  
LANGLEY-12271 878-10078 06  
Hydraulic dynamic analysis  
MSC-16795 878-10095 06  
Detection of boundary-layer transitions in wind tunnels  
LANGLEY-12261 878-10255 06  
Internal and external 2-d boundary layer flows  
LEWIS-13009 878-10260 06

**FLOW MEASUREMENT**  
In vivo blood-flow mapping  
NPO-14133 878-10244 05  
Meter for very slow flows  
MSC-18112 878-10267 07  
Aircraft trailing vortex hazard alleviators  
LANGLEY-12034 878-10272 07  
'Pseudobackscatter' laser velocimeter  
ARC-10970 878-10318 03  
Orifice calibration module  
LANGLEY-12269 878-10393 06  
Static-pressure probe for small geometries  
LANGLEY-11552 878-10395 06  
Miniature velocimeter  
LANGLEY-12281 878-10539 06

**FLOW REGULATORS**  
Precision fluid-pressure regulator  
NPO-13370 878-10106 07  
Meter for very slow flows  
MSC-18112 878-10267 07  
Flow-compensating pressure regulator  
LEWIS-12718 878-10522 05  
Automatic bypass valve  
LANGLEY-12063 878-10558 07  
Adjustable gas-flow restrictor  
MSC-19486 878-10560 07

**FLOW VELOCITY**  
Flow velocities and streamlines  
LEWIS-12966 878-10094 06  
Pneumatic servomechanisms  
M-FS-23295 878-10144 08  
Flow-compensating pressure regulator  
LEWIS-12718 878-10522 05

**FLOW VISUALIZATION**  
Detection of boundary-layer transitions in wind tunnels  
LANGLEY-12261 878-10255 06

**FLOWMETERS**  
Meter for very slow flows  
MSC-18112 878-10267 07

**FLUID DYNAMICS**  
Convectively cooled structures  
LANGLEY-12347 878-10404 06  
Graphics program for charts  
LEWIS-12811 878-10598 09

**FLUID FILTERS**  
Lines, bellows, flexible hoses, and filters  
LEWIS-13077 878-10424 07  
Drag-pump rotating filter  
MSC-16180 878-10563 07

Compact bypass-flow filter  
MSC-18311 878-10564 07

**FLUID FLOW**  
Precision fluid-pressure regulator  
NPO-13370 878-10106 07  
Thermal hydraulic analyzer  
MSC-18014 878-10265 06  
Meter for very slow flows  
MSC-18112 878-10267 07  
Static-pressure probe for small geometries  
LANGLEY-11552 878-10395 06  
Plotting shear-flow forces  
MSC-18013 878-10445 09  
Adjustable gas-flow restrictor  
MSC-19486 878-10560 07

**FLUID MECHANICS**  
Thermal hydraulic analyzer  
MSC-18014 878-10265 06

**FLUID SWITCHING ELEMENTS**  
Magnetostrictive valve  
NPO-14235 878-10104 07  
Fluidic-oscillator gas analyzer  
KSC-11014 878-10253 06

**FLUID TRANSMISSION LINES**  
Gentle support stands for fluid-line mockups  
MSC-16479 878-10291 08  
Lines, bellows, flexible hoses, and filters  
LEWIS-13077 878-10424 07  
Refrigerant leak detector  
MSC-18214 878-10551 06  
Transmitting rotary motion at an angle  
MSC-19483 878-10561 07

**FLUIDIC CIRCUITS**  
Fluidic-oscillator gas analyzer  
KSC-11014 878-10253 06

**FLUIDIZED BED PROCESSORS**  
Model of silicon production in a fluidized-bed reactor  
NPO-14404 878-10520 04

**FLUORESCENCE**  
Fluorescent paint simplifies laser-beam alignment  
LEWIS-12571 878-10030 03  
Custom blending of lamp phosphors  
MSC-16692 878-10056 04  
Fluorescent microspheres  
NPO-13946 878-10068 05  
Portable fluorescent-dye inspection device  
M-FS-24019 878-10139 08

**FLUORINE**  
Wide-temperature corrosion-resistant pressure regulator  
NPO-13776 878-10274 07

**FLUOROCARBONS**  
Fast-drying coating  
MSC-16056 878-10060 04

**FOAMS**  
Fire-retardant foams  
MSC-16222 878-10053 04  
Void-free foam insulation  
MSC-16805 878-10127 08  
High-rise foam-in-place process  
MSC-16931 878-10128 08  
Fire-retardant lightweight composite  
ARC-10918 878-10355 04  
Improved imide polymerization catalyst  
ARC-11107 878-10517 04

**FOCUSING**  
Zone-refining encapsulated semiconductors  
M-FS-23902 878-10351 04  
Diffractoid x-ray focusing  
GSFC-12357 878-10487 03

**FOLDING STRUCTURES**  
Collapsible module extends tenfold in height  
NPO-13371 878-10280 07

**FORCE DISTRIBUTION**  
Plotting shear-flow forces  
MSC-18013 878-10445 09  
Gear-tooth fatigue-strength estimates  
MSC-18167 878-10573 07

**FORECASTING**  
Predicting surface heat flux  
MSC-16095 878-10090 06

**FOSSIL FUELS**  
Energy conversion alternatives study  
LEWIS-13096 878-10330 03  
Coal desulfurization with iron pentacarbonyl  
NPO-14272 878-10342 04

**FOURIER ANALYSIS**  
Improved fourier interference spectrometer  
NPO-14025 878-10485 03

**FRACTURE STRENGTH**  
Partial interlaminar separation for composites  
LANGLEY-12065 878-10052 04

**FRAGMENTATION**  
Predicting damage from exploding vessels  
LEWIS-13042 878-10258 06

**FRAMES**  
Calculation of planar-truss modal frequencies  
LANGLEY-12137 878-10382 06  
Rigid 'Sling' for topheavy loads  
GSFC-12359 878-10574 07

**FREEZING**  
Controlled freezing of biological samples  
GSFC-12173 878-10065 05

**FREON**  
Refrigerant leak detector  
MSC-18214 878-10551 06

**FREQUENCY ANALYZERS**  
Hybrid random-sound test-control system  
NPO-13900 878-10025 02  
Wideband digital spectrum analyzer  
NPO-14394 878-10468 02

**FREQUENCY CONVERTERS**  
More efficient microwave-power transmission  
NPO-13885 878-10466 02

**FREQUENCY DISTRIBUTION**  
Improved fourier interference spectrometer  
NPO-14025 878-10485 03

**FREQUENCY DIVIDERS**  
Data reformatting with less hardware  
NPO-13676 878-10470 02

**FREQUENCY MEASUREMENT**  
Pseudo-continuous-wave acoustic instrument  
LANGLEY-12260 878-10248 06

**FREQUENCY MODULATION**  
Determining the response of an FM receiver  
MSC-16751 878-10465 02

**FREQUENCY MULTIPLIERS**  
Digital phase shifter synchronizes local oscillators  
MSC-16695 878-10011 01

**FREQUENCY SHIFT KEYING**  
Implementing OQASK by using MSK  
NPO-13896 878-10309 01

**FREQUENCY STABILITY**

Multichannel VCO needs only one reference

MSC-18225 B78-10448 01

**FREQUENCY STANDARDS**

Hydrogen-maser frequency standard

GSFC-12334 B78-10490 03

**FREQUENCY SYNCHRONIZATION**

Digital phase shifter synchronizes local oscillators

MSC-16695 B78-10011 01

**FRICTION DRAG**

Tumbling-vehicle entry heating

M-FS-23712 B78-10555 06

**FRICTION REDUCTION**

Dynamics of gas-thrust bearings

LEWIS-12754 B78-10097 06

Gas-path seal material

LEWIS-12623 B78-10347 04

Coating for hot sliding seals

MSC-16529 B78-10562 07

**FUEL CELLS**

Energy conversion alternatives study

LEWIS-13096 B78-10330 03

**FUEL CONSUMPTION**

Aerodynamic design lowers truck fuel consumption

FRC-11015 B78-10069 06

Boosting the power of two-stage engines

NPO-14057 B78-10105 07

**FUEL CONTROL**

Electric and hybrid vehicles

LEWIS-13077 B78-10423 07

**FUEL VALVES**

Simpler valve for reciprocating engines

MSC-16239 B78-10276 07

Low-leakage low-temperature valve

MSC-18087 B78-10420 07

**FUELS**

Coal liquefaction to increase jet fuel production

LANGLEY-12038 B78-10343 04

Low-temperature elastomer production and curing

NPO-13899 B78-10346 04

Predicting structures of cross-linked condensation polymers

NPO-14007 B78-10352 04

**FUNCTION GENERATORS**

Three-function signal generator

MSC-16672 B78-10306 01

**FURNACES**

Slurry-powder sintering furnace

LANGLEY-11423 B78-10293 08

Temperature-gradient oven

M-FS-23919 B78-10390 06

High-gradient continuous-casting furnace

LEWIS-12934 B78-10425 08

**FUSION (MELTING)**

Improved thermal-tile barrier

MSC-16929 B78-10133 08

**FUSION WELDING**

Improved electron-beam welder

M-FS-23772 B78-10143 08

**G****GALLIUM ARSENIDE LASERS**

Protective coating for laser diodes

LANGLEY-11746 B78-10171 03

**GALLIUM ARSENIDES**

More efficient GaAs solar cells

LANGLEY-12216 B78-10479 03

**GALVANOMETERS**

Noncontact measurement of angular deflection

LANGLEY-12178 B78-10071 06

**GANTRY CRANES**

Rigid 'Sling' for topheavy loads

GSFC-12359 B78-10574 07

**GARMENTS**

Automated controller for liquid-cooled garments

MSC-18055 B78-10365 05

**GAS ANALYSIS**

Simple air-piston gas-sampling system

LEWIS-12922 B78-10110 07

Improved 'spectrophone'

NPO-14143 B78-10167 03

Mass spectrometer calibration standard

NPO-14097 B78-10249 06

Free-air content in fluid systems

MSC-16703 B78-10251 06

Fluidic-oscillator gas analyzer

KSC-11014 B78-10253 06

Device for pitching off metal tubes

GSFC-12274 B78-10410 07

Porous bead packings for gas chromatography

ARC-11222 B78-10518 04

**GAS BEARINGS**

Dynamics of gas-thrust bearings

LEWIS-12754 B78-10097 06

Improved gas thrust bearings

LEWIS-12569 B78-10413 07

**GAS COMPOSITION**

Free-air content in fluid systems

MSC-16703 B78-10251 06

**GAS COOLING**

Controlled freezing of biological samples

GSFC-12173 B78-10065 05

Thermocouples measure very-hot gas temperatures

LEWIS-12843 B78-10076 06

Localized cooling of electronic components

LANGLEY-11955 B78-10569 07

**GAS DENSITY**

Improved electron-beam probe for hypersonic flows

NPO-13793 B78-10254 06

**GAS DETECTORS**

Thermal-leak analyzer for vacuum-jacketed lines

MSC-16802 B78-10085 06

Low-background trace-gas detector

NPO-13683 B78-10168 03

Damage-detection system for LNG carriers

LANGLEY-11463 B78-10250 06

Improved electron-beam probe for hypersonic flows

NPO-13793 B78-10254 06

NO<sub>2</sub> measurement by chemiluminescence

LANGLEY-11378 B78-10386 06

**GAS EVOLUTION**

Deaerating high-viscosity silicon rubber

MSC-16694 B78-10514 04

**GAS FLOW**

Automatic bypass valve

LANGLEY-12063 B78-10558 07

Adjustable gas-flow restrictor

MSC-19486 B78-10560 07

**GAS LUBRICANTS**

Dynamics of gas-thrust bearings

LEWIS-12754 B78-10097 06

**GAS MASERS**

Vacuum leadthrough for hydrogen maser

NPO-14148 B78-10422 07

Hydrogen-maser frequency standard

GSFC-12334 B78-10490 03

**GAS PIPES**

Thermal-leak analyzer for vacuum-jacketed lines

MSC-16802 B78-10085 06

**GAS PRESSURE**

Vacuum control for brazing stainless steel

MSC-19457 B78-10115 08

High-temperature microphone system

LANGLEY-12375 B78-10384 06

Topping pressure for gas-storage cylinders

MSC-18186 B78-10542 06

**GAS TEMPERATURE**

High-temperature microphone system

LANGLEY-12375 B78-10384 06

Standardized gas-temperature probes

LEWIS-13059 B78-10392 06

**GAS VALVES**

Magnetostriuctive valve

NPO-14235 B78-10104 07

Low-leakage low-temperature valve

MSC-18087 B78-10420 07

**GASES**

Embrittlement proof nickel-alloy bellows

M-FS-19331 B78-10349 04

Oxygen and nitrogen raman spectra

LEWIS-12849 B78-10361 04

Graphics program for charts

LEWIS-12811 B78-10598 09

**GASKETS**

High-pressure cryogenic cylinder seal

M-FS-19335 B78-10421 07

Ceramic-to-metal vacuum seal

NPO-13803 B78-10437 08

Metallic thermal seal

MSC-18135 B78-10566 07

**GASOLINE**

Coal liquefaction to increase jet fuel production

LANGLEY-12038 B78-10343 04

**GASTROINTESTINAL SYSTEM**

Antihistamines reduce ulceration

produced by indomethacin

ARC-11118 B78-10366 05

**GATES (CIRCUITS)**

Gate-assisted turn-off thyristor

LEWIS-12535 B78-10004 01

**GEAR TEETH**

Gear-tooth fatigue-strength estimates

MSC-18167 B78-10573 07

**GEARS**

Shaft speed control

NPO-14170 B78-10416 07

Elastic deformation of ball bearings, gears, and cams

LEWIS-13076 B78-10544 06

Gear-tooth fatigue-strength estimates

MSC-18167 B78-10573 07

**GELS**

Predicting structures of cross-linked condensation polymers

NPO-14007 B78-10352 04

**GEOCENTRIC COORDINATES**

Solar-electric geocentric transfer

LEWIS-12939 B78-10403 06

**GEOLOGY**

Mounting procedure for geological samples

MSC-18206 B78-10327 03

**GLASS**

- Pressure-sensitive glass reaction cell  
 LANGLEY-11256 878-10223 04  
 Vacuum leadthrough for hydrogen  
 maser  
 NPO-14148 878-10422 07

**GLASS COATINGS**

- Boron trifluoride coatings for plastics  
 ARC-11057 878-10043 04  
 Protective coating for laser diodes  
 LANGLEY-11746 878-10171 03

**GLASS FIBER REINFORCED PLASTICS**

- Heat resistant nontoxic laminate  
 ARC-11040 878-10356 04

**GLASS FIBERS**

- Contouring pile-brush seals  
 MSC-16231 878-10588 08

**GLAUCOMA**

- Intraocular pressure reduction and  
 regulation  
 LEWIS-12723 878-10523 05

**GLOW DISCHARGES**

- Boron trifluoride coatings for plastics  
 ARC-11057 878-10043 04  
 Abrasion-resistant antireflective coating  
 for polycarbonate  
 ARC-11047 878-10054 04

**GLYCOLS**

- Measuring metallic concentrations in  
 glycol solutions  
 M-FS-23894 878-10211 03

**GOLD ALLOYS**

- Compatibility of Au-Cu-Ni braze alloy  
 with NH<sub>3</sub>  
 MSC-16864 878-10219 04

**GOLD COATINGS**

- Eliminating gold migration in  
 microcircuits  
 MSC-18213 878-10462 01

**GONIOMETERS**

- Instrument measures many optical  
 properties in visible and IR  
 LANGLEY-12285 878-10489 03

**GRANULAR MATERIALS**

- Wrought nickel-base superalloy  
 LEWIS-12844 878-10045 04  
 Mounting procedure for geological  
 samples  
 MSC-18206 878-10327 03

**GRAPHITE**

- Response of graphite/epoxy composites  
 to moisture  
 MSC-16899 878-10228 04  
 Low-cost graphite/epoxy structural  
 panels  
 M-FS-23871 878-10427 08  
 Ion-beam-textured graphite  
 LEWIS-12724 878-10506 04

**GRAPHS (CHARTS)**

- Graphics program for charts  
 LEWIS-12811 878-10598 09

**GROUP VELOCITY**

- Direct-reading group-delay  
 measurement  
 NPO-13909 878-10156 01

**GUNN DIODES**

- Multichannel VCO needs only one  
 reference  
 MSC-18225 878-10448 01

**GYROSCOPES**

- Optical-gyroscope  
 NPO-14258 878-10176 03

**H****HALL EFFECT**

- Hall devices improve electric motor  
 efficiency  
 M-FS-23828 878-10303 01  
 Noncontacting valve-position indicator  
 MSC-16048 878-10412 07

**HANDBOOKS**

- Toxic substances handbook  
 LEWIS-13124 878-10359 04

**HANDLES**

- Modified pipe extension safely releases  
 chain binders  
 MSC-16937 878-10103 07  
 Ladle for pouring hot melt  
 MSC-16974 878-10137 08  
 Compact ratchet wrench  
 M-FS-24252 878-10273 07  
 Extension handle for spray cans  
 KSC-11083 878-10576 07

**HARDNESS**

- Scratch resistant plastic lenses  
 ARC-11039 878-10519 04

**HARDWARE**

- Holding fixture for variable-contour  
 parts  
 MSC-16270 878-10429 08

**HARNESSES**

- Spring control of wire harness loops  
 MSC-18246 878-10411 07

**HAZARDS**

- Predicting damage from exploding  
 vessels  
 LEWIS-13042 878-10258 06  
 Simulator for training  
 remote-manipulator operators  
 MSC-14921 878-10415 07

**HEARING**

- Implantable digital hearing aid  
 KSC-11009 878-10373 05

**HEART**

- Improved myocardium transducer  
 NPO-14107 878-10372 05

**HEART DISEASES**

- Noncontacting electrokinetography  
 system  
 MSC-18162 878-10533 05

**HEART FUNCTION**

- Hand-held vital-signals monitor  
 MSC-18232 878-10524 05  
 Hybrid ECG signal conditioner  
 MSC-18230 878-10526 05

**HEART RATE**

- Microprocessor-based cardiopulmonary  
 monitor  
 MSC-18235 878-10369 05  
 Hybrid heart/breath-rate processor  
 MSC-18227 878-10528 05

**HEAT BALANCE**

- Thermal compensator for helium  
 refrigerators  
 GSFC-12168 878-10082 06

**HEAT EXCHANGERS**

- Passive heat exchanger for solar  
 heating  
 M-FS-23914 878-10197 03  
 Protective coating for copper in  
 aluminum heat exchangers  
 M-FS-19334 878-10286 08

**HEAT FLUX**

- Predicting surface heat flux  
 MSC-16095 878-10090 06  
 Estimating regional heat flux from  
 scanning radiometer data  
 LANGLEY-12158 878-10329 03

**HEAT PIPES**

- Flat-plate heat pipe  
 GSFC-11998 878-10035 03  
 Modular heat-pipe-radiator panel  
 MSC-16625 878-10328 03  
 Improved heat-pipe wick  
 NPO-13391 878-10381 06

**HEAT PUMPS**

- Practical and efficient magnetic heat  
 pump  
 LEWIS-12508 878-10170 03

**HEAT RADIATORS**

- Flat-plate heat pipe  
 GSFC-11998 878-10035 03  
 Inspection of adhesive-bonded radiators  
 MSC-18062 878-10125 08  
 Modular heat-pipe-radiator panel  
 MSC-16625 878-10328 03  
 Breather cloth for vacuum curing  
 MSC-18063 878-10440 08

**HEAT RESISTANT ALLOYS**

- Wrought nickel-base superalloy  
 LEWIS-12844 878-10045 04  
 A sharp knife for high temperatures  
 MSC-16932 878-10278 07

**HEAT SHIELDING**

- Coated-felt thermal insulation  
 MSC-12737 878-10510 04  
 Metallic thermal seal  
 MSC-18135 878-10566 07  
 Contouring pile-brush seals  
 MSC-16231 878-10588 08

**HEAT SOURCES**

- Glass tubes for protecting solar cells  
 NPO-14200 878-10031 03

**HEAT STORAGE**

- Glass tubes for protecting solar cells  
 NPO-14200 878-10031 03

**HEAT TRANSFER**

- Flat-plate heat pipe  
 GSFC-11998 878-10035 03  
 Modular heat-pipe-radiator panel  
 MSC-16625 878-10328 03  
 Zone-refining encapsulated  
 semiconductors  
 M-FS-23902 878-10351 04  
 Convectively cooled structures  
 LANGLEY-12347 878-10404 06  
 Infrared scanners detect thermal  
 gradients in building walls  
 LANGLEY-12157 878-10480 03  
 Easily installed insulation for  
 steamfittings  
 MSC-18277 878-10589 08

**HEAT TREATMENT**

- Processing high-strength steel alloys  
 MSC-16172 878-10441 08

**HEATING**

- Prototype residential solar-energy  
 system  
 M-FS-23932 878-10191 03  
 Prototype residential solar-energy  
 system-engineering analysis  
 M-FS-23929 878-10192 03  
 Residential solar-heating system - design  
 brochure  
 M-FS-23933 878-10193 03

**HEATING EQUIPMENT**

- Prototype solar-heating system  
 M-FS-23916 878-10180 03  
 Residential solar-heating system  
 M-FS-23909 878-10181 03  
 Multichannel temperature control for  
 solar heating  
 M-FS-23775 878-10182 03

Prototype residential solar-energy system  
M-FS-23932 878-10191 03  
Prototype residential solar-energy system-engineering analysis  
M-FS-23929 878-10192 03  
Residential solar-heating system - design brochure  
M-FS-23933 878-10193 03  
Prototype solar-heating system-engineering analysis  
M-FS-23910 878-10194 03  
Prototype solar-heating system - installation manual  
M-FS-23907 878-10195 03  
Solar-heating module  
M-FS-23925 878-10196 03  
Passive heat exchanger for solar heating  
M-FS-23914 878-10197 03  
Passive heat exchanger - installation package  
M-FS-23930 878-10198 03  
Pump efficiency in solar-energy systems  
M-FS-23934 878-10213 03  
Protective coating for copper in aluminum heat exchangers  
M-FS-19334 878-10286 08  
Solar-powered hot-water system  
NPO-14270 878-10324 03  
Problems encountered in solar heating and cooling systems  
M-FS-23974 878-10331 03  
Prototype solar-heating system design package  
M-FS-23945 878-10332 03  
Prototype residential solar-energy system-design package  
M-FS-23953 878-10333 03  
Prototype residential solar-energy system-installation package  
M-FS-23956 878-10334 03  
Hot-air flat-plate solar collector-design package  
M-FS-23941 878-10335 03  
Evaluation of an air solar collector  
M-FS-23978 878-10336 03  
Indoor tests of a hot-air solar collector  
M-FS-23954 878-10337 03  
Performance evaluation of an air solar collector  
M-FS-23968 878-10338 03  
Outdoor tests of a liquid solar collector  
M-FS-23969 878-10339 03  
Solar-powered hot-air system  
M-FS-23976 878-10481 03  
Solar-heating system design data brochure  
M-FS-23977 878-10492 03  
Solar-heating system performance tests  
M-FS-25021 878-10493 03  
Solar-heating system  
M-FS-25022 878-10494 03  
Solar hot-water system  
M-FS-25043 878-10495 03  
Residential solar-heating system-design package  
M-FS-25071 878-10496 03  
Development and testing of a hot-air solar collector  
M-FS-23997 878-10497 03  
Design and installation of a flat-plate solar collector  
M-FS-25010 878-10498 03  
Liquid solar collector-performance tests  
M-FS-25082 878-10499 03

Concentrating solar collector-installation package  
M-FS-25068 878-10500 03  
Corrosion inhibitors for solar-heating and cooling  
M-FS-25023 878-10501 03  
Easily installed insulation for steamfittings  
MSC-18277 878-10589 08  
**HELICAL ANTENNAS**  
Compact antenna has symmetrical radiation pattern  
ARC-11189 878-10473 02  
**HELICOPTER CONTROL**  
Helicopter position stabilizing system  
LANGLEY-11670 878-10256 06  
**HELICOPTERS**  
Predicting rotor rotation noise  
LANGLEY-12098 878-10406 06  
**HELIUM**  
Thermal compensator for helium refrigerators  
GSFC-12168 878-10082 06  
**HEMOCYTES**  
Controlled freezing of biological samples  
GSFC-12173 878-10065 05  
**HEMOGLOBIN**  
Automated chromosome analysis  
NPO-13913 878-10364 05  
**HERMETIC SEALS**  
Transmitting rotary motion at an angle  
MSC-19483 878-10561 07  
**HIGH PRESSURE**  
High-pressure cryogenic cylinder seal  
M-FS-19335 878-10421 07  
**HIGH PRESSURE OXYGEN**  
Topping pressure for gas-storage cylinders  
MSC-18186 878-10542 06  
**HIGH STRENGTH**  
Ultra-high-strength boron fibers  
LEWIS-12739 878-10051 04  
**HIGH STRENGTH STEELS**  
Processing high-strength steel alloys  
MSC-16172 878-10441 08  
**HIGH TEMPERATURE**  
High-temperature brazing of stainless steel  
MSC-19459 878-10112 08  
High-temperature waterproofing for tiles  
MSC-16773 878-10135 08  
A sharp knife for high temperatures  
MSC-16932 878-10278 07  
High-temperature capacitive pressure transducer  
LEWIS-13078 878-10398 06  
**HIGH TEMPERATURE AIR**  
Indoor tests of a hot-air solar collector  
M-FS-23954 878-10337 03  
Solar-powered hot-air system  
M-FS-23976 878-10481 03  
Solar-heating system  
M-FS-25022 878-10494 03  
Residential solar-heating system-design package  
M-FS-25071 878-10496 03  
Development and testing of a hot-air solar collector  
M-FS-23997 878-10497 03  
Design and installation of a flat-plate solar collector  
M-FS-25010 878-10498 03  
Liquid solar collector-performance tests  
M-FS-25082 878-10499 03  
Wide-temperature corrosion-resistant pressure regulator  
NPO-13776 878-10274 07

**HIGH TEMPERATURE GASES**  
Thermocouples measure very-hot gas temperatures  
LEWIS-12843 878-10076 06  
**HIGH TEMPERATURE TESTS**  
Temperature-gradient oven  
M-FS-23919 878-10390 06  
**HIGH VOLTAGES**  
Low partial discharge vacuum feedthrough  
GSFC-12347 878-10559 07  
**HINGES**  
Rigid coupling is also flexible  
MSC-16488 878-10098 07  
'Nonfloating' universal joint  
MSC-19546 878-10108 07  
**HISTOGRAMS**  
Multidimensional histograms  
M-FS-23855 878-10503 03  
**HOLDERS**  
Tile-bonding tool  
KSC-11053 878-10134 08  
Gentle support stands for fluid-line mockups  
MSC-16479 878-10291 08  
Quick locking/unlocking retainer  
MSC-18048 878-10408 07  
Holding fixture for variable-contour parts  
MSC-16270 878-10429 08  
'Gentle' holder for brittle ceramics  
MSC-19645 878-10552 06  
Fastener for thermal insulation blankets  
MSC-18253 878-10571 07  
**HOLOGRAPHY**  
Measuring surface displacements optically  
M-FS-23861 878-10321 03  
**HONEYCOMB CORES**  
Brazen boron-silicon carbide/aluminum structural panels  
LANGLEY-12244 878-10221 04  
Fire-retardant lightweight composite  
ARC-10918 878-10355 04  
**HONEYCOMB STRUCTURES**  
Inspection of adhesive-bonded radiators  
MSC-18062 878-10125 08  
Fire-retardant lightweight composite  
ARC-10918 878-10355 04  
Heat resistant nontoxic laminate  
ARC-11040 878-10356 04  
Detecting moisture in composite honeycomb panels  
MSC-16750 878-10550 06  
**HORIZONTAL TAIL SURFACES**  
WAKE and WASH  
LANGLEY-12262 878-10093 06  
**HOSES**  
Lines, bellows, flexible hoses, and filters  
LEWIS-13077 878-10424 07  
**HOUSINGS**  
Housing protects laser in vacuum  
GSFC-12241 878-10028 03  
Safe venting for electronic components  
MSC-18007 878-10155 01  
**HYBRID CIRCUITS**  
Reclaiming hybrid integrated circuits  
MSC-16463 878-10129 08  
Control of dielectric film deposition  
LEWIS-13092 878-10430 08  
Miniature Ku-Band down converter  
MSC-18313 878-10450 01  
Eliminating gold migration in microcircuits  
MSC-18213 878-10462 01

Hand-held vital-signals monitor  
 MSC-18232 B78-10524 05  
 Hybrid temperature-monitoring circuit  
 MSC-18231 B78-10525 05  
 Hybrid ECG signal conditioner  
 MSC-18230 B78-10526 05  
 Hybrid LCD driver  
 MSC-18229 B78-10529 05  
 Hybrid clock generator  
 MSC-18228 B78-10530 05  
 Accelerated hybrid-circuit production  
 MSC-18272 B78-10585 08

**HYBRID PROPULSION**  
 Electric and hybrid vehicles  
 LEWIS-13077 B78-10423 07

**HYDRATES**  
 Fire-and smoke-retardant polyesters and elastomers  
 NPO-14053 B78-10058 04

**HYDRAULIC EQUIPMENT**  
 Hydraulic dynamic analysis  
 MSC-16795 B78-10095 06  
 Precision fluid-pressure regulator  
 NPO-13370 B78-10106 07  
 Thermal hydraulic analyzer  
 MSC-18014 B78-10265 06  
 Subminiature hydraulic actuator  
 LANGLEY-11522 B78-10269 07  
 Detecting servo failures with software  
 FRC-11003 B78-10396 06  
 Stable hydraulic pressure regulator  
 LEWIS-13058 B78-10417 07  
 Low-leakage low-temperature valve  
 MSC-18087 B78-10420 07

**HYDRAZINES**  
 Pressure-sensitive glass reaction cell  
 LANGLEY-11256 B78-10223 04  
 Wide-temperature corrosion-resistant pressure regulator  
 NPO-13776 B78-10274 07

**HYDROCARBON FUELS**  
 Hydrogen enrichment of synthetic fuel  
 M-FS-23279 B78-10039 04  
 Coal liquefaction to increase jet fuel production  
 LANGLEY-12038 B78-10343 04  
 Coal mining with a liquid solvent  
 NPO-14028 B78-10345 04

**HYDRODYNAMICS**  
 Self-centering stepped piston  
 LEWIS-12997 B78-10101 07

**HYDROGEN**  
 Embrittlement proof nickel-alloy bellows  
 M-FS-19331 B78-10349 04  
 Vacuum leadthrough for hydrogen maser  
 NPO-14148 B78-10422 07  
 Hydrogen-maser frequency standard  
 GSFC-12334 B78-10490 03

**HYDROGEN EMBRITTLEMENT**  
 Hydrogen embrittlement of nickel  
 ARC-10966 B78-10231 04

**HYDROGEN FUELS**  
 Hydrogen enrichment of synthetic fuel  
 M-FS-23279 B78-10039 04  
 Electrolysis cell stimulation  
 LEWIS-12740 B78-10179 03

**HYDROGEN PEROXIDE**  
 Chemiluminescence and bioluminescence microbe detection  
 MSC-16779 B78-10237 05

**HYDROMETERS**  
 Long-lasting solid-polymer electrolytic hygrometer  
 NPO-13948 B78-10086 06

**HYPERSONIC AIRCRAFT**  
 Convectively cooled structures  
 LANGLEY-12347 B78-10404 06

**HYPERSONIC BOUNDARY LAYER**  
 Improved electron-beam probe for hypersonic flows  
 NPO-13793 B78-10254 06

**HYPERSONIC FLOW**  
 Improved electron-beam probe for hypersonic flows  
 NPO-13793 B78-10254 06

**HYPERSONICS**  
 Shock-swallowing air sensor  
 FRC-10107 B78-10537 06

**HYSTERESIS**  
 One-third selection for matrix-addressing ferroelectrics  
 LANGLEY-11993 B78-10456 01

**IGNITERS**  
 Plasma igniter for internal-combustion engines  
 NPO-13828 B78-10100 07

**IGNITION**  
 Fire-resistant wood composites  
 ARC-11174 B78-10508 04  
 Real-time instrument averages 100 data sets  
 LEWIS-13093 B78-10534 06

**IGNITION SYSTEMS**  
 Plasma igniter for internal-combustion engines  
 NPO-13828 B78-10100 07

**ILLUMINATING**  
 System for monitoring lightning strikes  
 KSC-11018 B78-10475 02

**IMAGE CONVERTERS**  
 Video method for studying optical fields  
 M-FS-23103 B78-10036 03

**IMAGE CORRELATORS**  
 Measuring surface displacements optically  
 M-FS-23861 B78-10321 03

**IMAGE ENHANCEMENT**  
 Film adhesive enhances neutron radiographic images  
 MSC-18061 B78-10081 06  
 Postprocessing classification images  
 MSC-18238 B78-10601 09

**IMAGE INTENSIFIERS**  
 Low-intensity x-ray and gamma-ray imaging device  
 GSFC-12263 B78-10061 05

**IMAGERY**  
 Data reformatting with less hardware  
 NPO-13676 B78-10470 02  
 Multidimensional histograms  
 M-FS-23855 B78-10503 03

**IMAGES**  
 Signal-interleaving device  
 GSFC-12111 B78-10319 03

**IMAGING TECHNIQUES**  
 Low-intensity x-ray and gamma-ray imaging device  
 GSFC-12263 B78-10061 05  
 Processing multispectral signals from a discrete-sensor array  
 NPO-14211 B78-10442 09  
 Acoustic-optical imaging without immersion  
 M-FS-23876 B78-10549 06

Automated control of crystal growth  
 NPO-14420 B78-10582 08  
 Predicting crop production from satellite data  
 GSFC-12379 B78-10595 09

**IMIDES**  
 Polyimide adhesives for titanium and composite bonding  
 LANGLEY-12257 B78-10040 04  
 Improved imide polymerization catalyst  
 ARC-11107 B78-10517 04

**IMMUNOLOGY**  
 Fluorescent microspheres  
 NPO-13946 B78-10068 05

**IMPACT**  
 Shock during PIND test frees particles  
 M-FS-23829 B78-10389 06

**IMPACT RESISTANCE**  
 Partial interlaminar separation for composites  
 LANGLEY-12065 B78-10052 04  
 Abrasion-resistant antireflective coating for polycarbonate  
 ARC-11047 B78-10054 04

**IMPLANTATION**  
 Biocompatibility of surgical implants  
 NPO-14291 B78-10368 05  
 Implantable digital hearing aid  
 KSC-11009 B78-10373 05

**IMPLANTED ELECTRODES (BIOLOGY)**  
 Biomedical applications of ion-beam technology  
 LEWIS-12807 B78-10363 05  
 Improved myocardium transducer  
 NPO-14107 B78-10372 05

**IMPREGNATING**  
 Repairing silicon carbide coatings  
 MSC-18033 B78-10226 04

**IMPURITIES**  
 Multiple-sample holder for IC testing  
 NPO-14314 B78-10540 06

**IN-FLIGHT MONITORING**  
 Microprocessor-based cardiopulmonary monitor  
 MSC-18235 B78-10369 05

**INCOMPRESSIBLE FLOW**  
 Potential flows in propulsion system inlets  
 LEWIS-13010 B78-10553 06

**INCOMPRESSIBLE FLUIDS**  
 Self-centering stepped piston  
 LEWIS-12997 B78-10101 07

**INCONEL (TRADEMARK)**  
 Two braze alloys for thin-wall components  
 M-FS-19206 B78-10117 08

**INDEXES (DOCUMENTATION)**  
 Directory of fire research specialists  
 LEWIS-13123 B78-10399 06

**INDEXES (RATIOS)**  
 Performance optimizing  
 LANGLEY-11930 B78-10096 06

**INDICATING INSTRUMENTS**  
 Noncontacting valve-position indicator  
 MSC-16048 B78-10412 07  
 'Blind' position indicator  
 MSC-16972 B78-10570 07

**INDUCTION MOTORS**  
 Three-phase induction motors  
 MSC-16904 B78-10281 07

**INDUSTRIAL SAFETY**  
 High-pressure liquid chromatography of aromatic amines  
 LANGLEY-12163 B78-10515 04

**INERTIAL GUIDANCE**  
 Optical gyroscope  
 NPO-14258 B78-10176 03

**INFLATABLE STRUCTURES**

- Tile-bonding tool  
KSC-11053 B78-10134 08
- INFORMATION RETRIEVAL**  
Multiple-input land-use system concept  
NPO-13903 B78-10018 02  
Noise tolerant computer link  
NPO-14152 B78-10160 02  
Medical Information Management System  
GSFC-12078 B78-10376 05
- INFORMATION THEORY**  
Eliminating ambiguity in digital signals  
NPO-14289 B78-10469 02
- INFRARED DETECTORS**  
Infrared scanners detect thermal gradients in building walls  
LANGLEY-12157 B78-10480 03  
Instrument measures many optical properties in visible and IR  
LANGLEY-12285 B78-10489 03
- INFRARED IMAGERY**  
Infrared-enhanced TV for fire detection  
M-FS-19380 B78-10172 03
- INFRARED LASERS**  
Common-cavity pumped laser  
GSFC-12237 B78-10320 03
- INFRARED SCANNERS**  
Infrared scanners for temperature measurement in wind tunnels  
LANGLEY-12171 B78-10077 06  
Thermal-leak analyzer for vacuum-jacketed lines  
MSC-16802 B78-10085 06  
Infrared-enhanced TV for fire detection  
M-FS-19380 B78-10172 03  
Estimating regional heat flux from scanning radiometer data  
LANGLEY-12158 B78-10329 03
- INFRARED SPECTROMETERS**  
Automatic gain-balancing circuit  
LANGLEY-12074 B78-10297 01
- INFRARED SPECTROSCOPY**  
Thermal compensator for helium refrigerators  
GSFC-12168 B78-10082 06
- INGOTS**  
Controlling the growth of silicon sheets  
NPO-14295 B78-10581 08
- INHIBITORS**  
Corrosion inhibitors for solar heating and cooling systems  
M-FS-23892 B78-10209 03  
Corrosion inhibitors for solar-heating and cooling  
M-FS-25023 B78-10501 03
- INJECTION LASERS**  
Protective coating for laser diodes  
LANGLEY-11746 B78-10171 03
- INOCULATION**  
Automated electrochemical selection of coliforms  
MSC-16777 B78-10236 05
- INORGANIC COATINGS**  
Boron trifluoride coatings for plastics  
ARC-11057 B78-10043 04  
Protective coating for copper in aluminum heat exchangers  
M-FS-19334 B78-10286 08
- INORGANIC PEROXIDES**  
High-yield process for preparing calcium superoxide  
ARC-11053 B78-10216 04  
Economical synthesis of potassium superoxide  
ARC-10992 B78-10353 04

**INSPECTION**

- Window flaw detection by backscatter lighting  
MSC-16605 B78-10089 06  
Inspection of adhesive-bonded radiators  
MSC-18062 B78-10125 08  
Reclaiming hybrid integrated circuits  
MSC-16463 B78-10129 08  
Portable fluorescent-dye inspection device  
M-FS-24019 B78-10139 08  
Automated inspection of wire-frame assemblies  
GSFC-12321 B78-10546 06  
Detecting moisture in composite honeycomb panels  
MSC-16750 B78-10550 06

**INSTALLATION MANUALS**

- Prototype solar-heating system - installation manual  
M-FS-23907 B78-10195 03  
Passive heat exchanger - installation package  
M-FS-23930 B78-10198 03  
Flat-plate solar collector - installation package  
M-FS-23921 B78-10200 03

**INSTALLING**

- Prototype solar-heating system - installation manual  
M-FS-23907 B78-10195 03  
Passive heat exchanger - installation package  
M-FS-23930 B78-10198 03  
Flat-plate solar collector - installation package  
M-FS-23921 B78-10200 03  
Spares-optimized model  
MSC-18015 B78-10446 09  
Concentrating solar collector-installation package  
M-FS-25068 B78-10500 03  
Accelerated hybrid-circuit production  
MSC-18272 B78-10585 08

**INSTRUMENT ERRORS**

- Mass spectrometer calibration standard  
NPO-14097 B78-10249 06

**INSTRUMENT ORIENTATION**

- Laser beam assists in precision welding  
M-FS-19319 B78-10122 08

**INSULATION**

- High-temperature waterproofing for tiles  
MSC-16773 B78-10135 08  
Special weave for insulating fabrics  
MSC-16380 B78-10288 08  
Installing fiber insulation in tight spaces  
MSC-16934 B78-10289 08  
Insulator for cryogenic joints  
M-FS-19361 B78-10419 07  
Fastener for thermal insulation blankets  
MSC-18253 B78-10571 07  
Contouring pile-brush seals  
MSC-16231 B78-10588 08  
Easily installed insulation for steamfittings  
MSC-18277 B78-10589 08

**INSULIN**

- Boosting production yield of biomedical peptides  
NPO-14142 B78-10240 05

**INTEGRATED CIRCUITS**

- Automated tester for MOS devices  
NPO-14088 B78-10001 01  
Measuring oxide trapping parameters in MOS structure  
NPO-14120 B78-10002 01

- S-Band complex-weight module for adaptive processing  
LANGLEY-12197 B78-10005 01  
Curve tracer checks CMOS IC's  
GSFC-12209 B78-10007 01  
Simple tool removes IC flat packs  
MSC-16058 B78-10010 01  
CMOS bulk-metal design handbook  
M-FS-23856 B78-10142 08  
IC implementation of crossbar switches  
NPO-13837 B78-10153 01  
Analyzing CMOS/SOS fabrication for LSI arrays  
M-FS-23788 B78-10158 01  
Microcircuit-cleaning machine  
MSC-16060 B78-10292 08  
CMOS-array design-automation techniques  
M-FS-23762 B78-10311 01  
Shock during PIND test frees particles  
M-FS-23829 B78-10389 06  
Testing integrated circuits by photoexcitation  
M-FS-23943 B78-10451 01  
Eliminating gold migration in microcircuits  
MSC-18213 B78-10462 01  
Multiple-sample holder for IC testing  
NPO-14314 B78-10040 06  
SEM probe of IC radiation sensitivity  
NPO-14350 B78-10541 06  
Accelerated hybrid-circuit production  
MSC-18272 B78-10585 08  
All-ion-implantation process for integrated circuits  
M-FS-23995 B78-10590 08  
Sealing microcircuits with adhesives  
M-FS-23869 B78-10592 08

**INTEGRATORS**

- Voice-output solar energy reporter  
LEWIS-12947 B78-10022 02  
Inexpensive, portable, integrating solar energy meter  
LEWIS-12804 B78-10188 03

**INTEGRITY**

- Low-cost ultrasonic lamb-wave transducer  
MSC-16333 B78-10072 06

**INTERFACES**

- Computer interface for mechanical arm  
M-FS-23849 B78-10015 02  
28-Bit serial word simulator/monitor  
MSC-16418 B78-10315 02

**INTERFACIAL TENSION**

- Biocompatibility of surgical implants  
NPO-14291 B78-10368 05

**INTERFEROMETERS**

- Video method for studying optical fields  
M-FS-23103 B78-10036 03  
Improved double-pass michelson interferometer  
NPO-13999 B78-10177 03  
Improved fourier interference spectrometer  
NPO-14025 B78-10485 03  
Improved servo for a michaelson interferometer  
NPO-14093 B78-10488 03

**INTERLAYERS**

- Void-free bends in laminated structures  
MSC-16998 B78-10285 08

**INTERMEDIATE FREQUENCIES**

- Automatic acquisition and ranging system  
NPO-13982 B78-10312 02

**INTERNAL COMBUSTION ENGINES**

- Plasma igniter for internal-combustion engines  
NPO-13828 B78-10100 07  
Boosting the power of two-stage engines  
NPO-14057 B78-10105 07  
Real-time instrument averages 100 data sets  
LEWIS-13093 B78-10534 06

**INTERNAL PRESSURE**

- Pneumatic servomechanisms  
M-FS-23295 B78-10144 08

**INTERRUPTION**

- Automatic circuit interrupter  
MSC-16697 B78-10300 01

**INTESTINES**

- Improved probe for rectal-cancer detection  
NPO-14247 B78-10531 05  
Self-propelling, self-locating colonoscope  
NPO-14092 B78-10532 05

**INTRAOCULAR PRESSURE**

- Flow-compensating pressure regulator  
LEWIS-12718 B78-10522 05

**INVENTORY MANAGEMENT**

- Spares-optimized model  
MSC-18015 B78-10446 09  
Computation of spare parts requirements  
MSC-16872 B78-10593 09

**INVERTED CONVERTERS (DC TO AC)**

- Overload protection system  
NPO-13872 B78-10460 01  
Load balancing multimodule switching power converters  
NPO-13832 B78-10461 01

**INVERTERS**

- Gate-assisted turn-off thyristor  
LEWIS-12535 B78-10004 01  
Automatic load sharing in inverter modules  
NPO-14056 B78-10302 01  
Signal-interleaving device  
GSFC-12111 B78-10319 03

**ION BEAMS**

- Ion-beam texturing of materials  
LEWIS-12996 B78-10357 04  
Biomedical applications of ion-beam technology  
LEWIS-12807 B78-10363 05  
Ion-beam-textured graphite  
LEWIS-12724 B78-10506 04

**ION EXCHANGE MEMBRANE****ELECTROLYTES**

- Forming 'dynamic' membranes on stainless steel  
MSC-18172 B78-10513 04

**ION IMPLANTATION**

- All-ion-implantation process for integrated circuits  
M-FS-23995 B78-10590 08

**IRON ALLOYS**

- Two braze alloys for thin-wall components  
M-FS-19206 B78-10117 08

**IRON COMPOUNDS**

- Coal desulfurization with iron pentacarbonyl  
NPO-14272 B78-10342 04

**IRRADIANCE**

- Terrestrial photovoltaic measurements  
LEWIS-13057 B78-10310 01

**ISOLATORS**

- Coaxial isolator has versatile interface  
MSC-16908 B78-10009 01

**ISOMERS**

- High-pressure liquid chromatography of aromatic amines  
LANGLEY-12163 B78-10515 04

**J****JACKETS**

- Easily installed insulation for steamfittings  
MSC-18277 B78-10589 08

**JET AIRCRAFT**

- Convectively cooled structures  
LANGLEY-12347 B78-10404 06

**JET ENGINE FUELS**

- Coal liquefaction to increase jet fuel production  
LANGLEY-12038 B78-10343 04

**JET ENGINES**

- Oxygen and nitrogen raman spectra  
LEWIS-12849 B78-10361 04  
Nacelle incremental drag  
LEWIS-12786 B78-10400 06

**JIGS**

- Welding fixture for thin metal parts  
GSFC-12318 B78-10428 08  
'Gentle' holder for brittle ceramics  
MSC-19645 B78-10552 06

**JOINTS (JUNCTIONS)**

- Rigid coupling is also flexible  
MSC-16488 B78-10098 07  
'Nonfloating' universal joint  
MSC-19546 B78-10108 07  
Quick-connect threaded attachment joint  
LANGLEY-12232 B78-10414 07  
Insulator for cryogenic joints  
M-FS-19361 B78-10419 07

**K****KOVAR (TRADEMARK)**

- Bonding Kovar pins to an alumina substrate  
MSC-16828 B78-10130 08

**L****LABORATORY EQUIPMENT**

- Improvements in microelectrophoresis apparatus  
ARC-11121 B78-10247 05  
Retainer for laboratory animals  
LANGLEY-12353 B78-10371 05

**LAMB WAVES**

- Low-cost ultrasonic lamb-wave transducer  
MSC-16333 B78-10072 06

**LAMINATES**

- Polyimide adhesives for titanium and composite bonding  
LANGLEY-12257 B78-10040 04  
Partial interlaminar separation for composites  
LANGLEY-12065 B78-10052 04  
Ultrasonic evaluation of high-voltage circuit boards  
LEWIS-12781 B78-10087 06  
Friction of thick laminates  
LANGLEY-12010 B78-10284 08  
Void-free bends in laminated structures  
MSC-16998 B78-10285 08

- Fire-retardant lightweight composite  
ARC-10918 B78-10355 04  
Heat resistant nontoxic laminate  
ARC-11040 B78-10356 04  
Low-cost graphite/epoxy structural panels  
M-FS-23871 B78-10427 08

**LAND USE**

- Multiple-input land-use system concept  
NPO-13903 B78-10018 02

**LANDING AIDS**

- Air cushion landing system  
LANGLEY-12303 B78-10259 06

**LANDING SIMULATION**

- Approach and landing simulation  
LANGLEY-12060 B78-10091 06

**LANDSAT SATELLITES**

- Predicting crop production from satellite data  
GSFC-12379 B78-10595 09  
Postprocessing classification images  
MSC-18238 B78-10601 09

**LARGE SCALE INTEGRATION**

- CMOS bulk-metal design handbook  
M-FS-23856 B78-10142 08  
Analyzing CMOS/SOS fabrication for LSI arrays  
M-FS-23788 B78-10158 01

**LASER APPLICATIONS**

- Laser wire stripping  
MSC-18000 B78-10118 08  
Laser beam assists in precision welding  
M-FS-19319 B78-10122 08  
Improved 'spectrophone'  
NPO-14143 B78-10167 03  
Optical gyroscope  
NPO-14258 B78-10176 03  
Measuring surface displacements optically  
M-FS-23861 B78-10321 03  
Acoustic-optical imaging without immersion  
M-FS-23876 B78-10549 06

**LASER CAVITIES**

- Common-cavity pumped laser  
GSFC-12237 B78-10320 03

**LASER DOPPLER VELOCIMETERS**

- Directional laser velocimeter with doppler velocity simulator  
LANGLEY-12176 B78-10029 03  
In vivo blood-flow mapping  
NPO-14133 B78-10244 05  
'Pseudobackscatter' laser velocimeter  
ARC-10970 B78-10318 03  
Miniature velocimeter  
LANGLEY-12281 B78-10539 06

**LASER HEATING**

- Thermal compensator for helium refrigerators  
GSFC-12168 B78-10082 06  
Laser wire stripping  
MSC-18000 B78-10118 08

**LASER OUTPUTS**

- Laser beam color separator  
LANGLEY-11806 B78-10174 03

**LASER RANGE FINDERS**

- Self-navigating robot  
NPO-14190 B78-10026 02

**LASERS**

- Housing protects laser in vacuum  
GSFC-12241 B78-10028 03  
Common-cavity pumped laser  
GSFC-12237 B78-10320 03  
Vacuum-ultraviolet laser uses superfluid helium  
NPO-13993 B78-10323 03

- Low-power tuner for lasers  
M-FS-23863 B78-10486 03
- LATCHES**  
Dual-action expanded-latch mechanism  
M-FS-23557 B78-10277 07  
Coupler for moving vehicles  
GSFC-12322 B78-10407 07  
Combined hinge and latch  
MSC-19602 B78-10572 07
- LATEX**  
Fast-drying coating  
MSC-16056 B78-10060 04  
Chemical agent boosts natural-rubber output  
NPO-14185 B78-10358 04
- LEAKAGE**  
Rapid leak detection with liquid crystals  
MSC-13804 B78-10084 06  
Thermal-leak analyzer for vacuum-jacketed lines  
MSC-16802 B78-10085 06  
Self-centering stepped piston  
LEWIS-12997 B78-10101 07  
Damage-detection system for LNG carriers  
LANGLEY-11463 B78-10250 06
- LEARNING MACHINES**  
Self-navigating robot  
NPO-14190 B78-10026 02
- LEAST SQUARES METHOD**  
A parameter-estimation subroutine package  
NPO-14263 B78-10447 09
- LENSES**  
Noncontact measurement of angular deflection  
LANGLEY-12178 B78-10071 06  
Cosine-corrected optical diffuser  
NPO-14288 B78-10322 03  
Scratch resistant plastic lenses  
ARC-11039 B78-10519 04
- LEUKEMIAS**  
Body/bone-marrow differential-temperature sensor  
NPO-14121 B78-10066 05
- LIFE SUPPORT SYSTEMS**  
Economical synthesis of potassium superoxide  
ARC-10992 B78-10353 04
- LIFT**  
Wing aerodynamics under blowing jets  
LANGLEY-12256 B78-10401 06
- LIGHT AIRCRAFT**  
WAKE and WASH  
LANGLEY-12262 B78-10093 06
- LIGHT BEAMS**  
Fluorescent paint simplifies laser-beam alignment  
LEWIS-12571 B78-10030 03  
Noncontact optical communication between moving stations  
LANGLEY-12283 B78-10377 06
- LIGHT EMITTING DIODES**  
Protective coating for laser diodes  
LANGLEY-11746 B78-10171 03
- LIGHT MODULATION**  
Modulation improves electro-optic object detector  
M-FS-23776 B78-10380 06
- LIGHT SOURCES**  
Noncontact measurement of angular deflection  
LANGLEY-12178 B78-10071 06  
Portable fluorescent-dye inspection device  
M-FS-24019 B78-10139 08
- Common-cavity pumped laser  
GSFC-12237 B78-10320 03
- LIGHT TRANSMISSION**  
Improved optical filter  
GSFC-12225 B78-10027 03  
Optics for natural lighting  
LANGLEY-12333 B78-10189 03  
Signal-interleaving device  
GSFC-12111 B78-10319 03  
Compact turbidity meter  
KSC-11063 B78-10545 06
- LIGHTING EQUIPMENT**  
Custom blending of lamp phosphors  
MSC-16692 B78-10056 04
- LIMITER CIRCUITS**  
Overload protection system  
NPO-13872 B78-10460 01
- LINEAR PROGRAMMING**  
Performance optimizing  
LANGLEY-11930 B78-10096 06
- LINEAR SYSTEMS**  
Algorithms for linear-systems control  
LANGLEY-12313 B78-10443 09
- LINING PROCESSES**  
Installing fiber insulation in tight spaces  
MSC-16934 B78-10289 08
- LINKAGES**  
Dual-action expanded-latch mechanism  
M-FS-23557 B78-10277 07  
Coupler for moving vehicles  
GSFC-12322 B78-10407 07
- LIQUID AMMONIA**  
Compatibility of Au-Cu-Ni braze alloy with NH<sub>3</sub>  
MSC-16864 B78-10219 04
- LIQUID COOLING**  
Automated controller for liquid-cooled garments  
MSC-18055 B78-10365 05
- LIQUID CRYSTALS**  
Hybrid LCD driver  
MSC-18229 B78-10529 05
- LIQUID HELIUM**  
Vacuum-ultraviolet laser uses superfluid helium  
NPO-13993 B78-10323 03
- LIQUID INJECTION**  
High-rise foam-in-place process  
MSC-16931 B78-10128 08
- LIQUID METALS**  
Ladle for pouring hot melt  
MSC-16974 B78-10137 08  
Interactive data-processing system for metallurgy  
M-FS-23774 B78-10217 04
- LISTS**  
Directory of fire research specialists  
LEWIS-13123 B78-10399 06
- LITHIUM CHLORIDES**  
Chemical measurement of urine volume  
MSC-16585 B78-10238 05
- LOAD DISTRIBUTION (FORCES)**  
Plotting max/min data envelopes  
MSC-18016 B78-10597 09
- LOAD TESTS**  
'Gentle' holder for brittle ceramics  
MSC-19645 B78-10552 06
- LOADS (FORCES)**  
Combination force and angular-deflection indicator  
MSC-16155 B78-10070 06  
Resizing algorithm for loaded structures  
LANGLEY-12064 B78-10594 09
- LOCKING**  
Quick locking/unlocking retainer  
MSC-18048 B78-10408 07
- Antibackoff lock for nuts and bolts  
MSC-16472 B78-10409 07
- LOCKS (FASTENERS)**  
Combined hinge and latch  
MSC-19602 B78-10572 07
- LOGIC CIRCUITS**  
CMOS bulk-metal design handbook  
M-FS-23856 B78-10142 08  
IC implementation of crossbar switches  
NPO-13837 B78-10153 01  
Signal-interleaving device  
GSFC-12111 B78-10319 03
- LOGIC DESIGN**  
CMOS bulk-metal design handbook  
M-FS-23856 B78-10142 08  
CMOS-array design-automation techniques  
M-FS-23762 B78-10311 01  
Representation of multivalued logic functions  
NPO-13760 B78-10596 09
- LOW COST**  
Low-cost ultrasonic lamb-wave transducer  
MSC-16333 B78-10072 06
- LOW DENSITY MATERIALS**  
Match-mold process for foam insulation  
MSC-16631 B78-10126 08
- LOW FREQUENCIES**  
Airframe design for reducing cabin noise  
LANGLEY-12097 B78-10257 06
- LOW TEMPERATURE**  
Practical and efficient magnetic heat pump  
LEWIS-12508 B78-10170 03
- LOW TEMPERATURE BRAZING**  
Compatibility of Au-Cu-Ni braze alloy with NH<sub>3</sub>  
MSC-16864 B78-10219 04
- LOW TEMPERATURE TESTS**  
Bonding Kovar pins to an alumina substrate  
MSC-16828 B78-10130 08  
Mechanical properties of 18-2 Mn stainless steel  
M-FS-23843 B78-10229 04  
Nitronic 60: a new alloy  
M-FS-23844 B78-10230 04  
Thermoelectrically-cooled erature probe  
MSC-18192 B78-10484 03
- LUBRICATION**  
Dynamics of gas-thrust bearings  
LEWIS-12754 B78-10097 06
- LUMENS**  
A probe for blood-vessel and spinal interiors  
NPO-14132 B78-10242 05
- LUNAR GEOLOGY**  
Mounting procedure for geological samples  
MSC-18206 B78-10327 03

## M

## MACH NUMBER

- Shock-swallowing air sensor  
FRC-10107 B78-10537 06

## MACHINING

- Holding fixture for variable-contour parts  
MSC-16270 B78-10429 08  
Processing high-strength steel alloys  
MSC-16172 B78-10441 08



**MAGNETIC CIRCUITS**

Bonding core mating surfaces improves transformer  
NPO-13855 878-10283 08

**MAGNETIC CORES**

Improved transformer-winding method  
NPO-14243 878-10282 08  
Bonding core mating surfaces improves transformer  
NPO-13855 878-10283 08

**MAGNETIC FILMS**

Mossbauer studies of bulk and thin-film FeTe  
M-FS-23773 878-10059 04

**MAGNETIC TAPES**

Detecting and correcting bit errors on magnetic tape  
NPO-13842 878-10294 09

**MAGNETIC TRANSDUCERS**

Noncontacting valve-position indicator  
MSC-16048 878-10412 07  
Low-power tuner for lasers  
M-FS-23863 878-10486 03

**MAGNETOMETERS**

Two-position wax-motor rotary actuator  
GSFC-12521 878-10557 07

**MAGNETOSTRICTION**

Magnetostriuctive valve  
NPO-14235 878-10104 07

**MAGNETRONS**

More efficient microwave-power transmission  
NPO-13885 878-10466 02

**MAGNIFICATION**

Portable fluorescent-dye inspection device  
M-FS-24019 878-10139 08

**MAINTENANCE**

Improved epoxy adhesive with radiographic tracer  
MSC-18020 878-10225 04  
Repairing silicon carbide coatings  
MSC-18033 878-10226 04  
Problems encountered in solar heating and cooling systems  
M-FS-23974 878-10331 03  
Repairing pin-fin cold plates  
MSC-16424 878-10431 08  
Spares-optimized model  
MSC-18015 878-10446 09  
Splicing shielded cables  
MSC-18297 878-10453 01  
Concentrating solar collector-installation package  
M-FS-25068 878-10500 03  
Localized cooling of electronic components  
LANGLEY-11955 878-10569 07  
Electroplated 'cold patch' for critical parts  
M-FS-19401 878-10584 08  
Computation of spare parts requirements  
MSC-16872 878-10593 09

**MAJORITY CARRIERS**

More efficient GaAs solar cells  
LANGLEY-12216 878-10479 03

**MAN MACHINE SYSTEMS**

Self-navigating robot  
NPO-14190 878-10026 02

**MANAGEMENT INFORMATION SYSTEMS**

Processor for the UNIVAC 1100 series  
NPO-13469 878-10600 09

**MANAGEMENT PLANNING**

Price and cost estimation  
M-FS-23812 878-10599 09

**MANAGEMENT SYSTEMS**

Verification of redundancy management design  
MSC-16713 878-10145 09

**MANIPULATORS**

Simulator for training remote-manipulator operators  
MSC-14921 878-10415 07

**MAPPING**

Ocean-wave ray or crest diagrams in shoaling waters  
LANGLEY-12380 878-10341 03  
Postprocessing classification images  
MSC-18238 878-10601 09

**MARKING**

Fluorescent microspheres  
NPO-13946 878-10068 05

**MASERS**

Ruby c-axis alignment system  
NPO-14252 878-10379 06  
Hydrogen-maser frequency standard  
GSFC-12334 878-10490 03

**MASKING**

Simplified tooling for spray masking  
MSC-16927 878-10136 08

**MASS DISTRIBUTION**

Rigid 'Sling' for topheavy loads  
GSFC-12359 878-10574 07

**MASS SPECTROMETERS**

Mass spectrometer calibration standard  
NPO-14097 878-10249 06

**MATCHING**

Precise matching of diodes  
NPO-14293 878-10452 01

**MATERIAL ABSORPTION**

Low-background trace-gas detector  
NPO-13683 878-10168 03

**MATERIALS**

A solid-state phase-insensitive ultrasonic transducer  
LANGLEY-12304 878-10385 06

**MATERIALS HANDLING**

Self-sterilizing canister  
NPO-14237 878-10064 05  
Dual relief-valve system  
LANGLEY-12267 878-10111 07  
Ladle for pouring hot melt  
MSC-16974 878-10137 08  
Simulator for training remote-manipulator operators  
MSC-14921 878-10415 07  
Rigid 'Sling' for topheavy loads  
GSFC-12359 878-10574 07

**MATHEMATICAL LOGIC**

Representation of multivalued logic functions  
NPO-13760 878-10596 09

**MATHEMATICAL MODELS**

Hydraulic dynamic analysis  
MSC-16795 878-10095 06  
Three-phase induction motors  
MSC-16904 878-10281 07

**MATRICES (MATHEMATICS)**

Processing multispectral signals from a discrete-sensor array  
NPO-14211 878-10442 09  
Algorithms for linear-systems control  
LANGLEY-12313 878-10443 09  
A parameter-estimation subroutine package  
NPO-14263 878-10447 09

**MEASUREMENT**

Long-lasting solid-polymer electrolytic hygrometer  
NPO-13948 878-10086 06

**MEASURING INSTRUMENTS**

Measuring surface displacements optically  
M-FS-23861 878-10321 03  
Sweat collection capsule  
ARC-11031 878-10367 05  
Measuring poisson's ratio in elastomers  
M-FS-23878 878-10387 06  
Instrument measures many optical properties in visible and IR  
LANGLEY-12285 878-10489 03  
Measurement of subcoat thickness by characteristic x-rays  
MSC-16718 878-10505 04  
Compact turbidity meter  
KSC-11063 878-10545 06  
Automated inspection of wire-frame assemblies  
GSFC-12321 878-10546 06

**MECHANICAL DEVICES**

Simple tool removes IC flat packs  
MSC-16058 878-10010 01  
Computer interface for mechanical arm  
M-FS-23849 878-10015 02  
Compact ratchet wrench  
M-FS-24252 878-10273 07  
Antibackoff lock for nuts and bolts  
MSC-16472 878-10409 07  
Holding fixture for variable-contour parts  
MSC-16270 878-10429 08  
Safe, durable soil sampler  
MSC-18171 878-10577 07  
Wrench for thin-walled cylinders  
LANGLEY-12286 878-10579 07

**MECHANICAL DRIVES**

Design of transmission shafting  
LEWIS-12965 878-10107 07  
'Nonfloating' universal joint  
MSC-19546 878-10108 07  
Dual-action expanded-latch mechanism  
M-FS-23557 878-10277 07  
Two-position wax-motor rotary actuator  
GSFC-12521 878-10557 07  
Durable nonslip stainless-steel drivebelts  
GSFC-12276 878-10567 07  
Two (or more) rotary outputs from one input  
MSC-19450 878-10568 07  
Gear-tooth fatigue-strength estimates  
MSC-18167 878-10573 07

**MECHANICAL MEASUREMENT**

Quick-and-easy shear-load testing  
MSC-16765 878-10073 06

**MECHANICAL PROPERTIES**

Brazed boron-silicon carbide/aluminum structural panels  
LANGLEY-12244 878-10221 04  
Response of graphite/epoxy composites to moisture  
MSC-16899 878-10228 04  
Mechanical properties of 18-2 Mn stainless steel  
M-FS-23843 878-10229 04  
Nitronic 60: a new alloy  
M-FS-23844 878-10230 04  
Hydrogen embrittlement of nickel  
ARC-10966 878-10231 04  
Thermal hydraulic analyzer  
MSC-18014 878-10265 06  
Measuring poisson's ratio in elastomers  
M-FS-23878 878-10387 06  
Dynamic measurement of bulk modulus  
NPO-13226 878-10543 06  
Gear-tooth fatigue-strength estimates  
MSC-18167 878-10573 07

**MECHANICAL SHOCK**

Shock during PIND test frees particles  
M-FS-23829 B78-10389 06

**MEDICAL ELECTRONICS**

Wideband EMG telemetry system  
ARC-11209 B78-10375 05  
Hand-held vital-signals monitor  
MSC-18232 B78-10524 05  
Hybrid temperature-monitoring circuit  
MSC-18231 B78-10525 05  
Hybrid ECG signal conditioner  
MSC-18230 B78-10526 05  
Hybrid LCD driver  
MSC-18229 B78-10529 05  
Hybrid clock generator  
MSC-18228 B78-10530 05  
Noncontacting electrokinetography system  
MSC-18162 B78-10533 05

**MEDICAL EQUIPMENT**

Improvements in microelectrophoresis apparatus  
ARC-11121 B78-10247 05  
Sweat collection capsule  
ARC-11031 B78-10367 05  
Implantable digital hearing aid  
KSC-11009 B78-10373 05  
Hybrid respiration-signal conditioner  
MSC-18226 B78-10527 05  
Hybrid heart/breath-rate processor  
MSC-18227 B78-10528 05  
Improved probe for rectal-cancer detection  
NPO-14247 B78-10531 05

**MEDICAL SCIENCE**

Toxic substances handbook  
LEWIS-13124 B78-10359 04

**MEDICAL SERVICES**

Medical Information Management System  
GSFC-12078 B78-10376 05

**MELTING**

Ladle for pouring hot melt  
MSC-16974 B78-10137 08

**MELTING POINTS**

Thermocouples measure very-hot gas temperatures  
LEWIS-12843 B78-10076 06

**MEMBRANE STRUCTURES**

Positively charged membrane for urea dialysis  
NPO-14101 B78-10241 05

**MEMBRANES**

Pressure-sensitive glass reaction cell  
LANGLEY-11256 B78-10223 04  
Forming 'dynamic' membranes on stainless steel  
MSC-18172 B78-10513 04

**MERCURY LAMPS**

Custom blending of lamp phosphors  
MSC-16692 B78-10056 04

**MESH**

Internal grid for release of brazing retorts  
MSC-19472 B78-10114 08

**METABOLIC WASTES**

Sweat collection capsule  
ARC-11031 B78-10367 05

**METAL BONDING**

Process fabricates flat panels at high temperatures  
MSC-16969 B78-10116 08  
Two braze alloys for thin-wall components  
M-FS-19206 B78-10117 08

Detecting overpenetration of electron-beam welds  
M-FS-19396 B78-10586 08

**METAL COATINGS**

Improved alkali-metal/silicate binders  
GSFC-12303 B78-10224 04  
Natural-oxide solar-collector coatings  
M-FS-23518 B78-10326 03  
Embrittlement proof nickel-alloy bellows  
M-FS-19331 B78-10349 04  
Ion-beam texturing of materials  
LEWIS-12996 B78-10357 04  
Electroplated 'cold patch' for critical parts  
M-FS-19401 B78-10584 08

**METAL CRYSTALS**

Hydrogen embrittlement of nickel  
ARC-10966 B78-10231 04

**METAL FILMS**

Mossbauer studies of bulk and thin-film FeTe  
M-FS-23773 B78-10059 04  
Preparing thin aluminum films for adhesive bonding  
NPO-14357 B78-10591 08

**METAL JOINTS**

Reducing weld peaking in aluminum  
M-FS-23973 B78-10433 08

**METAL OXIDE SEMICONDUCTORS**

Automated tester for MOS devices  
NPO-14088 B78-10001 01  
Measuring oxide trapping parameters in MOS structure  
NPO-14120 B78-10002 01  
CMOS bulk-metal design handbook  
M-FS-23856 B78-10142 08  
Analyzing CMOS/SOS fabrication for LSI arrays  
M-FS-23788 B78-10158 01  
CMOS-array design-automation techniques  
M-FS-23762 B78-10311 01  
All-ion-implantation process for integrated circuits  
M-FS-23995 B78-10590 08

**METAL POWDER**

Surface examination of small particles  
LEWIS-12842 B78-10075 06  
Slurry-powder sintering furnace  
LANGLEY-11423 B78-10293 08

**METAL STRIPS**

Human arm may act as antenna  
ARC-11195 B78-10161 02

**METAL SURFACES**

Verifying the fit of mating contoured surfaces  
LANGLEY-11731 B78-10290 08  
Natural-oxide solar-collector coatings  
M-FS-23518 B78-10326 03

**METAL WORKING**

Improved heat-pipe wick  
NPO-13391 B78-10381 06  
Processing high-strength steel alloys  
MSC-16172 B78-10441 08

**METAL-METAL BONDING**

Brazing dissimilar aluminum alloys  
MSC-16340 B78-10587 08

**METALS**

Interactive data-processing system for metallurgy  
M-FS-23774 B78-10217 04

**METHANE**

Hydrogen enrichment of synthetic fuel  
M-FS-23279 B78-10039 04

**MICE**

Retainer for laboratory animals  
LANGLEY-12353 B78-10371 05

**MICHELSON INTERFEROMETERS**

Improved double-pass michelson interferometer  
NPO-13999 B78-10177 03  
Improved fourier interference spectrometer  
NPO-14025 B78-10485 03  
Improved servo for a michelson interferometer  
NPO-14093 B78-10488 03

**MICROCRACKS**

Pulse-echo probe of rock permeability near oil wells  
NPO-14192 B78-10222 04

**MICROELECTRONICS**

Microstrip backfire antenna  
LANGLEY-12172 B78-10019 02  
Flicking-wire drag tensioner  
MSC-16367 B78-10109 07  
CMOS bulk-metal design handbook  
M-FS-23856 B78-10142 08  
Analyzing CMOS/SOS fabrication for LSI arrays  
M-FS-23788 B78-10158 01  
Microcircuit-cleaning machine  
MSC-16060 B78-10292 08

**MICROPARTICLES**

Fluorescent microspheres  
NPO-13946 B78-10068 05

**MICROPHONES**

High-temperature microphone system  
LANGLEY-12375 B78-10384 06

**MICROSCOPES**

Automated chromosome analysis  
NPO-13913 B78-10364 05

**MICROSCOPY**

Mounting procedure for geological samples  
MSC-18206 B78-10327 03

**MICROWAVE ANTENNAS**

Efficient rectifying antenna  
NPO-13884 B78-10471 02  
Compact antenna has symmetrical radiation pattern  
ARC-11189 B78-10473 02

**MICROWAVE CIRCUITS**

S-Band complex-weight module for adaptive processing  
LANGLEY-12197 B78-10005 01

**MICROWAVE EMISSION**

Hydrogen-maser frequency standard  
GSFC-12334 B78-10490 03

**MICROWAVE EQUIPMENT**

Coaxial isolator has versatile interface  
MSC-16908 B78-10009 01  
Temperature stabilization of microwave ferrite devices  
MSC-16833 B78-10152 01  
Direct-reading group-delay measurement  
NPO-13909 B78-10156 01  
Arc detector uses fiber optics  
NPO-13377 B78-10449 01  
Miniature Ku-Band down converter  
MSC-18313 B78-10450 01  
More efficient microwave-power transmission  
NPO-13885 B78-10466 02  
Lightweight conical antenna reflector  
NPO-13552 B78-10472 02

**MICROWAVE REFLECTOMETERS**

Dynamic measurement of bulk modulus  
NPO-13226 B78-10543 06

**MICROWAVE SWITCHING**

High-power RF switch  
NPO-14229 B78-10151 01

- Temperature stabilization of microwave ferrite devices  
MSC-16833 878-10152 01
- MICROWAVE TRANSMISSION**  
Temperature stabilization of microwave ferrite devices  
MSC-16833 878-10152 01  
Direct-reading group-delay measurement  
NPO-13909 878-10156 01  
Arc detector uses fiber optics  
NPO-13377 878-10449 01
- MICROWAVES**  
Microwave-beam safety subsystem  
NPO-14224 878-10317 02  
Arc detector uses fiber optics  
NPO-13377 878-10449 01
- MINERAL DEPOSITS**  
Improved nucleonic coal-thickness monitor  
M-FS-23725 878-10344 04
- MINERAL EXPLORATION**  
Portable data system  
ARC-11136 878-10316 02
- MINING**  
Improved nucleonic coal-thickness monitor  
M-FS-23725 878-10344 04  
Coal mining with a liquid solvent  
NPO-14028 878-10345 04
- MIRRORS**  
High-vacuum, low-temperature bond for second-surface mirrors  
M-FS-23405 878-10124 08  
Optics for natural lighting  
LANGLEY-12333 878-10189 03
- MIXING CIRCUITS**  
Pulse-width-modulated attenuator for AGC  
NPO-14127 878-10459 01
- MODAL RESPONSE**  
Calculation of planar-truss modal frequencies  
LANGLEY-12137 878-10382 06
- MODELS**  
Noise calculation on the basis of vortex flow models  
LANGLEY-12271 878-10078 06  
Pneumatic servomechanisms  
M-FS-23295 878-10144 08  
Fabrication of sea-floor models  
NPO-13554 878-10295 09
- MODULATION**  
Direct-reading group-delay measurement  
NPO-13909 878-10156 01  
Implementing OQASK by using MSK  
NPO-13896 878-10309 01
- MODULATORS**  
Pulse-width-modulated attenuator for AGC  
NPO-14127 878-10459 01
- MODULES**  
Collapsible module extends tenfold in height  
NPO-13371 878-10280 07  
Photovoltaic systems test facility  
LEWIS-13073 878-10378 06  
Orifice calibration module  
LANGLEY-12269 878-10393 06  
Improved method of solar-cell assembly  
LEWIS-12729 878-10438 08
- MOISTURE CONTENT**  
Response of graphite/epoxy composites to moisture  
MSC-16899 878-10228 04
- Effects of moisture on graphite/epoxy composites  
MSC-18045 878-10360 04  
Detecting moisture in composite honeycomb panels  
MSC-16750 878-10550 06  
Sealing microcircuits with adhesives  
M-FS-23869 878-10592 08
- MOISTURE METERS**  
Sealing microcircuits with adhesives  
M-FS-23869 878-10592 08
- MOLDS**  
Dip-molded t-shaped cannula  
NPO-14073 878-10062 05  
Void-free foam insulation  
MSC-16805 878-10127 08  
High-rise foam-in-place process  
MSC-16931 878-10128 08
- MOLECULAR IONS**  
Positively charged membrane for urea dialysis  
NPO-14101 878-10241 05
- MOLYBDENUM**  
Modified chemiluminescent NO analyzer accurately measures NOX  
LEWIS-12850 878-10047 04  
Electroplating and stripping copper on molybdenum and niobium  
LEWIS-12151 878-10055 04
- MONITORS**  
Real-time monitoring of crustal deformations  
NPO-14124 878-10034 03  
Automatic radio-transmission monitor  
NPO-13941 878-10165 02  
Automatic gain-balancing circuit  
LANGLEY-12074 878-10297 01  
28-Bit serial word simulator/monitor  
MSC-16418 878-10315 02  
Microwave-beam safety subsystem  
NPO-14224 878-10317 02  
Improved nucleonic coal-thickness monitor  
M-FS-23725 878-10344 04  
Remotely-powered intracranial pressure monitor  
ARC-11120 878-10362 05  
Microprocessor-based cardiopulmonary monitor  
MSC-18235 878-10369 05  
Electrical-ground monitor  
MSC-18281 878-10455 01  
Multiplexed battery-bypass control system  
NPO-14414 878-10474 02
- MOSSBAUER EFFECT**  
Mossbauer studies of bulk and thin-film FeTe  
M-FS-23773 878-10059 04
- MOTION STABILITY**  
Improved notation controller  
GSFC-12273 878-10383 06
- MOTORS**  
Three-phase induction motors  
MSC-16904 878-10281 07  
Hall devices improve electric motor efficiency  
M-FS-23828 878-10303 01  
Electric and hybrid vehicles  
LEWIS-13077 878-10423 07  
Dynamic braking of bidirectional motors  
ARC-11194 878-10578 07
- MOUNTING**  
High-vacuum, low-temperature bond for second-surface mirrors  
M-FS-23405 878-10124 08
- Mounting procedure for geological samples  
MSC-18206 878-10327 03  
Riveting-force gage  
NPO-13477 878-10432 08
- MOVING TARGET INDICATORS**  
Air-traffic surveillance systems  
NPO-14173 878-10313 02
- MULTICHANNEL COMMUNICATION**  
Multichannel VCO needs only one reference  
MSC-18225 878-10448 01
- MULTILAYER INSULATION**  
Laser wire stripping  
MSC-18000 878-10118 08  
Match-mold process for foam insulation  
MSC-16631 878-10126 08  
Void-free foam insulation  
MSC-16805 878-10127 08  
High-rise foam-in-place process  
MSC-16931 878-10128 08  
Fastener for thermal insulation blankets  
MSC-18253 878-10571 07
- MULTIPLEXING**  
IC implementation of crossbar switches  
NPO-13837 878-10153 01  
Multiplexed battery-bypass control system  
NPO-14414 878-10474 02
- MULTISPECTRAL PHOTOGRAPHY**  
Multidimensional histograms  
M-FS-23855 878-10503 03  
Predicting crop production from satellite data  
GSFC-12379 878-10595 09
- MUSCULAR FUNCTION**  
Wideband EMG telemetry system  
ARC-11209 878-10375 05
- MYLAR (TRADEMARK)**  
Partial interlaminar separation for composites  
LANGLEY-12065 878-10052 04
- MYOCARDIUM**  
Improved myocardium transducer  
NPO-14107 878-10372 05

## N

## NACELLES

- Nacelle incremental drag  
LEWIS-12786 878-10400 06

## NETWORK ANALYSIS

- Telecommunications network optimization  
NPO-14486 878-10476 02

## NEUTRON ACTIVATION ANALYSIS

- Film adhesive enhances neutron radiographic images  
MSC-18061 878-10081 06

## NEUTRON SCATTERING

- Film adhesive enhances neutron radiographic images  
MSC-18061 878-10081 06

## NEWTON-RAPHSON METHOD

- Predicting surface heat flux  
MSC-16095 878-10090 06  
Analysis of beam columns  
MSC-18009 878-10402 06  
Convectively cooled structures  
LANGLEY-12347 878-10404 06

## NICKEL

- Compatibility of Au-Cu-Ni braze alloy with NH<sub>3</sub>  
MSC-16864 878-10219 04

Hydrogen embrittlement of nickel  
ARC-10966 B78-10231 04

**NICKEL ALLOYS**  
Wrought nickel-base superalloy  
LEWIS-12844 B78-10045 04  
Two braze alloys for thin-wall components  
M-FS-19206 B78-10117 08  
A sharp knife for high temperatures  
MSC-16932 B78-10278 07  
Embrittlement proof nickel-alloy bellows  
M-FS-19331 B78-10349 04  
High-gradient continuous-casting furnace  
LEWIS-12934 B78-10425 08

**NICKEL CADMIUM BATTERIES**  
Continuous process fabricates battery plaque  
GSFC-12054 B78-10132 08

**NICKEL COATINGS**  
Continuous process fabricates battery plaque  
GSFC-12054 B78-10132 08

**NICKEL PLATE**  
Processing high-strength steel alloys  
MSC-16172 B78-10441 08

**NIOBIUM**  
Electroplating and stripping copper on molybdenum and niobium  
LEWIS-12151 B78-10055 04

**NITROGEN**  
Oxygen and nitrogen raman spectra  
LEWIS-12849 B78-10361 04

**NITROGEN DIOXIDE**  
NO<sub>2</sub> measurement by chemiluminescence  
LANGLEY-11378 B78-10386 06

**NITROGEN OXIDES**  
Modified chemiluminescent NO analyzer accurately measures NOX  
LEWIS-12850 B78-10047 04

**NOISE MEASUREMENT**  
Noise calculation on the basis of vortex flow models  
LANGLEY-12271 B78-10078 06  
Calibration standards for PIND tests  
MSC-18169 B78-10388 06  
Shock during PIND test frees particles  
M-FS-23829 B78-10389 06  
Predicting rotor rotation noise  
LANGLEY-12098 B78-10406 06

**NOISE METERS**  
Pseudo-continuous-wave acoustic instrument  
LANGLEY-12260 B78-10248 06

**NOISE REDUCTION**  
Noise tolerant computer link  
NPO-14152 B78-10160 02  
Airframe design for reducing cabin noise  
LANGLEY-12097 B78-10257 06

**NOMOGRAPH**  
Free-air content in fluid systems  
MSC-16703 B78-10251 06

**NONDESTRUCTIVE TESTS**  
Calibration method for an ultrasonic gray-scale recorder  
LEWIS-12782 B78-10016 02  
High-resolution gray-scale recorder  
LEWIS-12783 B78-10017 02  
Infrared scanners for temperature measurement in wind tunnels  
LANGLEY-12171 B78-10077 06  
Film adhesive enhances neutron radiographic images  
MSC-18061 B78-10081 06

Window flaw detection by backscatter lighting  
MSC-16605 B78-10089 06  
Inspection of adhesive-bonded radiators  
MSC-18062 B78-10125 08  
Improved epoxy adhesive with radiographic tracer  
MSC-18020 B78-10225 04  
Corrosion detection and evaluation  
M-FS-24436 B78-10227 04  
Pseudo-continuous-wave acoustic instrument  
LANGLEY-12260 B78-10248 06  
A solid-state phase-insensitive ultrasonic transducer  
LANGLEY-12304 B78-10385 06  
Automated inspection of wire-frame assemblies  
GSFC-12321 B78-10546 06  
Acoustic-optical imaging without immersion  
M-FS-23876 B78-10549 06  
Detecting moisture in composite honeycomb panels  
MSC-16750 B78-10550 06  
Detecting overpenetration of electron-beam welds  
M-FS-19396 B78-10586 08

**NONFLAMMABLE MATERIALS**  
Flame-retardant adhesive tape  
MSC-16721 B78-10041 04  
Fire-retardant epoxy polymers  
ARC-11182 B78-10218 04  
Heat resistant nontoxic laminate  
ARC-11040 B78-10356 04  
Coated-felt thermal insulation  
MSC-12737 B78-10510 04

**NUCLEAR MAGNETIC RESONANCE**  
Pulsed NMR spectroscopy  
NPO-14023 B78-10175 03  
Boosting production yield of biomedical peptides  
NPO-14142 B78-10240 05

**NUCLEAR POWER PLANTS**  
Directory of fire research specialists  
LEWIS-13123 B78-10399 06

**NUCLEAR RADIATION SPECTROSCOPY**  
Mossbauer studies of bulk and thin-film FeTe  
M-FS-23773 B78-10059 04

**NUCLEAR REACTORS**  
Convectively cooled structures  
LANGLEY-12347 B78-10404 06

**NUCLEONICS**  
Improved nucleonic coal-thickness monitor  
M-FS-23725 B78-10344 04

**NUMERICAL ANALYSIS**  
Bit-synchronizer lock detector  
MSC-16744 B78-10164 02  
Analysis of beam columns  
MSC-18009 B78-10402 06

**NUMERICAL CONTROL**  
Data processing for water monitoring system  
MSC-16842 B78-10234 05  
Microprocessor-based cardiopulmonary monitor  
MSC-18235 B78-10369 05

**NOTATION**  
Improved notation controller  
GSFC-12273 B78-10383 06

**NUTS (FASTENERS)**  
Antibackoff lock for nuts and bolts  
MSC-16472 B78-10409 07

## O

**O RING SEALS**  
High-pressure cryogenic cylinder seal  
M-FS-19335 B78-10421 07

**OCEAN MODELS**  
Fabrication of sea-floor models  
NPO-13554 B78-10295 09

**OCEANOGRAPHY**  
Ocean-wave ray or crest diagrams in shoaling waters  
LANGLEY-12380 B78-10341 03

**OIL EXPLORATION**  
Pulse-echo probe of rock permeability near oil wells  
NPO-14192 B78-10222 04

**OIL FIELDS**  
Pulse-echo probe of rock permeability near oil wells  
NPO-14192 B78-10222 04

**OIL RECOVERY**  
Pulse-echo probe of rock permeability near oil wells  
NPO-14192 B78-10222 04

**OPACITY**  
Compact turbidity meter  
KSC-11063 B78-10545 06

**OPHTHALMOLOGY**  
Intraocular pressure reduction and regulation  
LEWIS-12723 B78-10523 05

**OPTICAL COMMUNICATION**  
Noncontact optical communication between moving stations  
LANGLEY-12283 B78-10377 06

**OPTICAL DATA PROCESSING**  
Video method for studying optical fields  
M-FS-23103 B78-10036 03

**OPTICAL DENSITY**  
Calibration method for an ultrasonic gray-scale recorder  
LEWIS-12782 B78-10016 02  
High-resolution gray-scale recorder  
LEWIS-12783 B78-10017 02  
Compact turbidity meter  
KSC-11063 B78-10545 06

**OPTICAL EQUIPMENT**  
Improved double-pass michelson interferometer  
NPO-13999 B78-10177 03  
Signal-interleaving device  
GSFC-12111 B78-10319 03  
Cosine-corrected optical diffuser  
NPO-14288 B78-10322 03  
NO<sub>2</sub> measurement by chemiluminescence  
LANGLEY-11378 B78-10386 06  
Processing multispectral signals from a discrete-sensor array  
NPO-14211 B78-10442 09  
Diffractoid x-ray focusing  
GSFC-12357 B78-10487 03

**OPTICAL FILTERS**  
Improved optical filter  
GSFC-12225 B78-10027 03

**OPTICAL GYROSCOPES**  
Optical gyroscope  
NPO-14258 B78-10176 03

**OPTICAL MEASUREMENT**  
Measuring surface displacements optically  
M-FS-23861 B78-10321 03  
Ocean-wave ray or crest diagrams in shoaling waters  
LANGLEY-12380 B78-10341 03

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- Automated chromosome analysis  
NPO-13913 878-10364 05  
Detecting surface deformations  
photographically  
MSC-16156 878-10547 06
- OPTICAL MEASURING INSTRUMENTS**  
Video method for studying optical fields  
M-FS-23103 878-10036 03  
Improved double-pass michelson  
interferometer  
NPO-13999 878-10177 03  
'Pseudobackscatter' laser velocimeter  
ARC-10970 878-10318 03  
Modulation improves electro-optic object  
detector  
M-FS-23776 878-10380 06  
Improved fourier interference  
spectrometer  
NPO-14025 878-10485 03  
Improved servo for a michelson  
interferometer  
NPO-14093 878-10488 03  
Miniature velocimeter  
LANGLEY-12281 878-10539 06  
Automated control of crystal growth  
NPO-14420 878-10582 08
- OPTICAL PATHS**  
Low-background trace-gas detector  
NPO-13683 878-10168 03
- OPTICAL PROPERTIES**  
Instrument measures many optical  
properties in visible and IR  
LANGLEY-12285 878-10489 03
- OPTICAL PUMPING**  
Common-cavity pumped laser  
GSFC-12237 878-10320 03  
Vacuum-ultraviolet laser uses superfluid  
helium  
NPO-13993 878-10323 03
- OPTICAL RADAR**  
Optical traffic-sensing concept  
NPO-13603 878-10021 02
- OPTICAL RANGE FINDERS**  
Optical traffic-sensing concept  
NPO-13603 878-10021 02
- OPTICAL REFLECTION**  
Optics for natural lighting  
LANGLEY-12333 878-10189 03
- OPTICAL SCANNERS**  
Testing integrated circuits by  
photoexcitation  
M-FS-23943 878-10451 01
- OPTIMAL CONTROL**  
Performance optimizing  
LANGLEY-11930 878-10096 06
- ORBITAL POSITION ESTIMATION**  
A parameter-estimation subroutine  
package  
NPO-14263 878-10447 09
- ORGANIC COMPOUNDS**  
Low-temperature elastomer production  
and curing  
NPO-13899 878-10346 04
- ORGANIC MATERIALS**  
Predicting structures of cross-linked  
condensation polymers  
NPO-14007 878-10352 04
- ORIFICE FLOW**  
Orifice calibration module  
LANGLEY-12269 878-10393 06
- ORTHOPEDECS**  
Biomedical applications of ion-beam  
technology  
LEWIS-12807 878-10363 05  
Wideband EMG telemetry system  
ARC-11209 878-10375 05
- ORTHOTROPIC PLATES**  
Analysis of cracked orthotropic sheets  
LANGLEY-12288 878-10405 06
- OSCILLATING FLOW**  
Fluidic-oscillator gas analyzer  
KSC-11014 878-10253 06
- OSCILLATION DAMPERS**  
Vibration-free thermal link  
GSFC-12297 878-10169 03  
Low-frequency vibration isolation  
NPO-13915 878-10275 07
- OSCILLATORS**  
Three-function signal generator  
MSC-16672 878-10306 01
- OSMOSIS**  
Forming 'dynamic' membranes on  
stainless steel  
MSC-18172 878-10513 04
- OUTGASSING**  
Vacuum control for brazing stainless  
steel  
MSC-19457 878-10115 08
- Ovens**  
Verifying the fit of mating contoured  
surfaces  
LANGLEY-11731 878-10290 08  
Slurry-powder sintering furnace  
LANGLEY-11423 878-10293 08  
Temperature-gradient oven  
M-FS-23919 878-10390 06
- OXIDATION**  
Surface examination of small particles  
LEWIS-12842 878-10075 06
- OXIDATION RESISTANCE**  
Low-chromium stainless steels  
LEWIS-12543 878-10046 04  
Long-lasting solid-polymer electrolytic  
hygrometer  
NPO-13948 878-10086 06
- OXIDE FILMS**  
Surface examination of small particles  
LEWIS-12842 878-10075 06  
Natural-oxide solar-collector coatings  
M-FS-23518 878-10326 03
- OXIDES**  
NO<sub>2</sub> measurement by  
chemiluminescence  
LANGLEY-11378 878-10386 06
- OXIMETRY**  
A probe for blood-vessel and spinal  
interiors  
NPO-14132 878-10242 05
- OXYGEN**  
Oxygen and nitrogen raman spectra  
LEWIS-12849 878-10361 04
- OXYGEN PRODUCTION**  
High-yield process for preparing calcium  
superoxide  
ARC-11053 878-10216 04  
Economical synthesis of potassium  
superoxide  
ARC-10992 878-10353 04
- OXYGEN REGULATORS**  
Adjustable gas-flow restrictor  
MSC-19486 878-10560 07
- OXYGEN SUPPLY EQUIPMENT**  
High-yield process for preparing calcium  
superoxide  
ARC-11053 878-10216 04
- OXYGENATION**  
Dip-molded t-shaped cannula  
NPO-14073 878-10062 05  
A probe for blood-vessel and spinal  
interiors  
NPO-14132 878-10242 05
- PACKAGING**  
Self-sterilizing canister  
NPO-14237 878-10064 05
- PAINTS**  
Fluorescent paint simplifies laser-beam  
alignment  
LEWIS-12571 878-10030 03  
Fast-drying coating  
MSC-16056 878-10060 04  
Improved alkali-metal/silicate binders  
GSFC-12303 878-10224 04  
Coating for hot sliding seals  
MSC-16529 878-10562 07
- PANELS**  
Lattice panels with high structural  
efficiency  
LANGLEY-11898 878-10426 08  
Low-cost graphite/epoxy structural  
panels  
M-FS-23871 878-10427 08
- PANORAMIC CAMERAS**  
Wide angle pinhole camera  
LANGLEY-11905 878-10173 03
- PARABOLIC ANTENNAS**  
Optimizing multislot feeds for reflecting  
antennas  
NPO-14064 878-10314 02
- PARABOLIC REFLECTORS**  
High-temperature solar converter  
GSFC-12234 878-10032 03
- PARACHUTE FABRICS**  
Scale parachute fabrication  
M-FS-23139 878-10141 08
- PARACHUTES**  
Scale parachute fabrication  
M-FS-23139 878-10141 08
- PARTIAL DIFFERENTIAL EQUATIONS**  
Body-fitted coordinates systems  
transformations  
LANGLEY-12307 878-10147 09
- PARTICLE MOTION**  
Automated electrophoresis apparatus  
M-FS-23983 878-10516 04  
Separating biological cells  
M-FS-23883 878-10521 05
- PARTICLES**  
Calibration standards for PIND tests  
MSC-18169 878-10388 06  
Shock during PIND test frees particles  
M-FS-23829 878-10389 06
- PARTICULATE SAMPLING**  
Water sample-collection and distribution  
system  
MSC-16841 878-10235 05  
Biological sampling and cleaning device  
NPO-14010 878-10245 05
- PATIENTS**  
Medical Information Management  
System  
GSFC-12078 878-10376 05
- PAYLOADS**  
Rigid 'Sling' for topheavy loads  
GSFC-12359 878-10574 07
- PEDALS**  
Combination force and angular-deflection  
indicator  
MSC-16155 878-10070 06
- PENETRATION**  
Penetrating fire extinguisher  
KSC-11064 878-10397 06  
Detecting overpenetration of  
electron-beam welds  
M-FS-19396 878-10586 08

**PEPTIDES**

Boosting production yield of biomedical peptides  
NPO-14142 878-10240 05

**PERFORMANCE PREDICTION**

Air cushion landing system  
LANGLEY-12303 878-10259 06

**PERFORMANCE TESTS**

Test-vehicle cycle programmer  
LEWIS-12977 878-10020 02

Performance optimizing  
LANGLEY-11930 878-10096 06

Strobe-margin test for plated memory systems  
M-FS-23838 878-10154 01

Prototype solar-heating system-engineering analysis  
M-FS-23910 878-10194 03

Testing of three hot-air solar collectors  
M-FS-23887 878-10201 03

Performance and structural tests of hot-air solar collectors  
M-FS-23911 878-10203 03

Thermal performance of a hot-air solar collector  
M-FS-23924 878-10204 03

Flat-plate liquid solar collector  
M-FS-23912 878-10205 03

Performance evaluations of a liquid solar collector  
M-FS-23931 878-10206 03

Evaluation of an air solar collector  
M-FS-23978 878-10336 03

Indoor tests of a hot-air solar collector  
M-FS-23954 878-10337 03

Performance evaluation of an air solar collector  
M-FS-23968 878-10338 03

Outdoor tests of a liquid solar collector  
M-FS-23969 878-10339 03

Solar simulator test facility  
M-FS-23972 878-10477 03

Solar-heating system performance tests  
M-FS-25021 878-10493 03

Development and testing of a hot-air solar collector  
M-FS-23997 878-10497 03

Liquid solar collector-performance tests  
M-FS-25082 878-10499 03

**PERSPIRATION**  
Sweat collection capsule  
ARC-11031 878-10367 05

**PHASE CONTROL**  
Femtosecond time-domain phase comparator  
GSFC-12228 878-10162 02

Phase-shift array, arbitrary and continuous through 360 deg  
LANGLEY-12272 878-10308 01

**PHASE DETECTORS**  
Femtosecond time-domain phase comparator  
GSFC-12228 878-10162 02

Chopper-stabilized phase detector  
MSC-16461 878-10163 02

Simplified phase detector  
NPO-13395 878-10457 01

Narrow-bandwidth receiver  
GSFC-12142 878-10463 02

**PHASE ERROR**  
Femtosecond time-domain phase comparator  
GSFC-12228 878-10162 02

Bit-synchronizer lock detector  
MSC-16744 878-10164 02

**PHASE LOCKED SYSTEMS**

Digital phase shifter synchronizes local oscillators  
MSC-16695 878-10011 01

Bit-synchronizer lock detector  
MSC-16744 878-10164 02

**PHASE MODULATION**

Determining the response of an FM receiver  
MSC-16751 878-10465 02

**PHASE SHIFT**

Femtosecond time-domain phase comparator  
GSFC-12228 878-10162 02

**PHASE SHIFT CIRCUITS**

Digital phase shifter synchronizes local oscillators  
MSC-16695 878-10011 01

Directional laser velocimeter with doppler velocity simulator  
LANGLEY-12176 878-10029 03

Control of small phased-array antennas  
MSC-14938 878-10166 02

Phase-shift array, arbitrary and continuous through 360 deg  
LANGLEY-12272 878-10308 01

**PHASE SHIFT KEYING**

Eliminating ambiguity in digital signals  
NPO-14289 878-10469 02

**PHASED ARRAYS**

Control of small phased-array antennas  
MSC-14938 878-10166 02

**PHONOCARDIOGRAPHY**

Noncontacting electrokinetography system  
MSC-18162 878-10533 05

**PHOSPHORIC ACID**

Long-lasting solid-polymer electrolytic hygrometer  
NPO-13948 878-10086 06

**PHOSPHORS**

Custom blending of lamp phosphors  
MSC-16692 878-10056 04

**PHOSPHORUS**

Fire-retardant epoxy polymers  
ARC-11182 878-10218 04

**PHOTODECOMPOSITION**

Solar photolysis of water  
NPO-14126 878-10049 04

**PHOTOELECTRIC CELLS**

Noncontact measurement of angular deflection  
LANGLEY-12178 878-10071 06

More efficient GaAs solar cells  
LANGLEY-12216 878-10479 03

Ultrathin films as photomechanical transducer  
NPO-14363 878-10491 03

**PHOTOELECTRIC EMISSION**

Testing integrated circuits by photoexcitation  
M-FS-23943 878-10451 01

**PHOTOGRAPHIC MEASUREMENT**

Detecting surface deformations photographically  
MSC-16156 878-10547 06

**PHOTOGRAPHIC RECORDING**

Z-axis control loop for cathode-ray tubes  
NPO-13775 878-10305 01

**PHOTOGRAPHY**

Wide angle pinhole camera  
LANGLEY-11905 878-10173 03

**PHOTOLUMINESCENCE**

Custom blending of lamp phosphors  
MSC-16692 878-10056 04

**PHOTOLYSIS**

Solar photolysis of water  
NPO-14126 878-10049 04

**PHOTOMECHANICAL EFFECT**

Ultrathin films as photomechanical transducer  
NPO-14363 878-10491 03

**PHOTOMETERS**

Video method for studying optical fields  
M-FS-23103 878-10036 03

**PHOTOVOLTAIC CELLS**

Terrestrial photovoltaic measurements  
LEWIS-13057 878-10310 01

Power loss for high-voltage solar-cell arrays  
LEWIS-12865 878-10340 03

Photovoltaic systems test facility  
LEWIS-13073 878-10378 06

Improved method of solar-cell assembly  
LEWIS-12729 878-10438 08

**PHYSIOLOGICAL RESPONSES**

Hand-held vital-signals monitor  
MSC-18232 878-10524 05

Hybrid temperature-monitoring circuit  
MSC-18231 878-10525 05

Hybrid ECG signal conditioner  
MSC-18230 878-10526 05

Hybrid LCD driver  
MSC-18229 878-10529 05

Hybrid clock generator  
MSC-18228 878-10530 05

**PIERCING**

Penetrating fire extinguisher  
KSC-11064 878-10397 06

**PIEZOELECTRIC TRANSDUCERS**

A solid-state phase-insensitive ultrasonic transducer  
LANGLEY-12304 878-10385 06

**PINHOLES**

Rapid leak detection with liquid crystals  
MSC-13804 878-10084 06

**PINS**

High-strength blind rivet  
LANGLEY-12154 878-10287 08

**PIPELINES**

Solar hot-water system  
M-FS-25043 878-10495 03

**PIPES (TUBES)**

Gentle support stands for fluid-line mockups  
MSC-16479 878-10291 08

Device for pitching off metal tubes  
GSFC-12274 878-10410 07

Quick-connect threaded attachment joint  
LANGLEY-12232 878-10414 07

Insulator for cryogenic joints  
M-FS-19361 878-10419 07

**PISTON ENGINES**

Boosting the power of two-stage engines  
NPO-14057 878-10105 07

Simpler valve for reciprocating engines  
MSC-16239 878-10276 07

**PISTONS**

Self-centering stepped piston  
LEWIS-12997 878-10101 07

Compact piston-position sensor  
LEWIS-12392 878-10102 07

Simple air-piston gas-sampling system  
LEWIS-12922 878-10110 07

High-pressure cryogenic cylinder seal  
M-FS-19335 878-10421 07

**PICTURING MOMENTS**

Aircraft trailing vortex hazard alleviators  
LANGLEY-12034 878-10272 07

**PITOT TUBES**

Static-pressure probe for small geometries  
 LANGLEY-11552 B78-10395 06

**PIVOTS**

Rigid coupling is also flexible  
 MSC-16488 B78-10098 07

**PLANNING**

Thin silicon-solar cell fabrication  
 NPO-14047 B78-10325 03

**PLANTS (BOTANY)**

Chemical agent boosts natural-rubber output  
 NPO-14185 B78-10358 04

**PLASMA ELECTRODES**

Plasma igniter for internal-combustion engines  
 NPO-13828 B78-10100 07

**PLASMA HEATING**

Plasma igniter for internal-combustion engines  
 NPO-13828 B78-10100 07

**PLASTIC COATINGS**

Boron trifluoride coatings for plastics  
 ARC-11057 B78-10043 04

**PLASTIC PROPERTIES**

Scratch resistant plastic lenses  
 ARC-11039 B78-10519 04

**PLASTICS**

Predicting structures of cross-linked condensation polymers  
 NPO-14007 B78-10352 04  
 Antistatic coating for acrylics  
 NPO-13867 B78-10509 04

**PLATENS**

High-temperature brazing of stainless steel  
 MSC-19459 B78-10112 08  
 Form die and glide plates for vacuum brazing  
 MSC-16549 B78-10113 08

**PLATES (STRUCTURAL MEMBERS)**

Brazed boron-silicon carbide/aluminum structural panels  
 LANGLEY-12244 B78-10221 04

**PLATING**

Electroplated 'cold patch' for critical parts  
 M-FS-19401 B78-10584 08

**PLATINUM**

Calibration target for temperature radiometer  
 LANGLEY-12239 B78-10083 06

**PLENUM CHAMBERS**

Air cushion landing system  
 LANGLEY-12303 B78-10259 06

**PLOTTING**

Plotting shear-flow forces  
 MSC-18013 B78-10445 09  
 Plotting max/min data envelopes  
 MSC-18016 B78-10597 09

**PLUGGING**

Device for pitching off metal tubes  
 GSFC-12274 B78-10410 07  
 Repairing pin-fin cold plates  
 MSC-16424 B78-10431 08

**PLUGS**

Repairing pin-fin cold plates  
 MSC-16424 B78-10431 08

**PLYWOOD**

Form die and glide plates for vacuum brazing  
 MSC-16549 B78-10113 08

**PNEUMATIC CONTROL**

Improved gas thrust bearings  
 LEWIS-12569 B78-10413 07

**PNEUMATIC EQUIPMENT**

Pneumatic servomechanisms  
 M-FS-23295 B78-10144 08

**POISONS**

Toxic substances handbook  
 LEWIS-13124 B78-10359 04

**POISSON RATIO**

Measuring poisson's ratio in elastomers  
 M-FS-23878 B78-10387 06

**POLISHING**

Process for growing thin polished silicon sheets  
 NPO-14172 B78-10434 08

**POLLUTION**

Automated syringe sampler  
 LANGLEY-12308 B78-10374 05

**POLLUTION CONTROL**

Microbial desulfurization of coal  
 NPO-14227 B78-10038 04

**POLLUTION MONITORING**

Rapid measurement of bacteria in water  
 GSFC-12158 B78-10232 05  
 Monitoring systems for community water supplies  
 MSC-16778 B78-10233 05  
 Data processing for water monitoring system  
 MSC-16842 B78-10234 05  
 Compact turbidity meter  
 KSC-11063 B78-10545 06

**POLYBENZIMIDAZOLE**

Ultrafine PBI fibers and yarns  
 ARC-11221 B78-10504 04

**POLYCARBONATES**

Abrasion-resistant antireflective coating for polycarbonate  
 ARC-11047 B78-10054 04  
 Long-lasting solid-polymer electrolytic hygrometer  
 NPO-13948 B78-10086 06

**POLYESTERS**

Fire-and smoke-retardant polyesters and elastomers  
 NPO-14053 B78-10058 04

**POLYIMIDES**

Polyimide adhesives for titanium and composite bonding  
 LANGLEY-12257 B78-10040 04  
 Fire-retardant foams  
 MSC-16222 B78-10053 04  
 Antistatic additive for polyimide films  
 NPO-14232 B78-10220 04

**POLYISOPRENES**

Chemical agent boosts natural-rubber output  
 NPO-14185 B78-10358 04

**POLYMER CHEMISTRY**

High-pressure liquid chromatography of aromatic amines  
 LANGLEY-12163 B78-10515 04  
 Porous bead packings for gas chromatography  
 ARC-11222 B78-10518 04

**POLYMER PHYSICS**

Separating biological cells  
 M-FS-23883 B78-10521 05

**POLYMERIC FILMS**

Selection standard for FEP films for solar energy  
 MSC-16999 B78-10190 03  
 Antistatic additive for polyimide films  
 NPO-14232 B78-10220 04

**POLYMERIZATION**

Improved imide polymerization catalyst  
 ARC-11107 B78-10517 04

**POLYMERS**

Fire-retardant epoxy polymers  
 ARC-11182 B78-10218 04

**POLYURETHANE FOAM**

High-rise foam-in-place process  
 MSC-16931 B78-10128 08  
 Insulator for cryogenic joints  
 M-FS-19361 B78-10419 07

**POROUS MATERIALS**

Tool simplifies weld preparation of aluminum  
 MSC-16992 B78-10123 08

**PORPHYRINS**

Chemiluminescence and bioluminescence microbe detection  
 MSC-16779 B78-10237 05

**PORTABLE EQUIPMENT**

Portable spark-gap arc generator  
 LEWIS-12886 B78-10008 01  
 Hand-held vital-signals monitor  
 MSC-18232 B78-10524 05  
 Hybrid temperature-monitoring circuit  
 MSC-18231 B78-10525 05  
 Hybrid ECG signal conditioner  
 MSC-18230 B78-10526 05  
 Hybrid LCD driver  
 MSC-18229 B78-10529 05  
 Hybrid clock generator  
 MSC-18228 B78-10530 05

**POSITION (LOCATION)**

Compact piston-position sensor  
 LEWIS-12392 B78-10102 07  
 Helicopter position stabilizing system  
 LANGLEY-11670 B78-10256 06

**POSITION INDICATORS**

Compact piston-position sensor  
 LEWIS-12392 B78-10102 07  
 Noncontacting valve-position indicator  
 MSC-16048 B78-10412 07  
 'Blind' position indicator  
 MSC-16972 B78-10570 07

**POSITIONING**

Housing protects laser in vacuum  
 GSFC-12241 B78-10028 03  
 Laser beam assists in precision welding  
 M-FS-19319 B78-10122 08  
 Tile-bonding tool  
 KSC-11053 B78-10134 08

**POSITIONING DEVICES (MACHINERY)**

Collapsible module extends tenfold in height  
 NPO-13371 B78-10280 07

**POTASSIUM COMPOUNDS**

Economical synthesis of potassium superoxide  
 ARC-10992 B78-10353 04

**POTENTIAL FLOW**

Potential flows in propulsion system inlets  
 LEWIS-13010 B78-10553 06

**POTTING COMPOUNDS**

No-warp potted circuits  
 MSC-19729 B78-10435 08

**POURING**

Void-free foam insulation  
 MSC-16805 B78-10127 08  
 High-rise foam-in-place process  
 MSC-16931 B78-10128 08

**POWDER METALLURGY**

Wrought nickel-base superalloy  
 LEWIS-12844 B78-10045 04  
 Slurry-powder sintering furnace  
 LANGLEY-11423 B78-10293 08

**POWER EFFICIENCY**

Boosting the power of two-stage engines  
 NPO-14057 B78-10105 07

**POWER LINES**

- Power-switch dV/dt sensing  
 MSC-16707 878-10307 01  
 Transmitting rotary motion at an angle  
 MSC-19483 878-10561 07

**POWER SPECTRA**

- Measuring radio-signal power accurately  
 NPO-13373 878-10464 02

**POWER SUPPLY CIRCUITS**

- Efficient dc-to-dc converter  
 FRC-11014 878-10012 01  
 Automatic load sharing in inverter modules  
 NPO-14056 878-10302 01  
 Voltage regulator for solar panels  
 NPO-13895 878-10478 03

**PRECIPITATION (CHEMISTRY)**

- Positively charged membrane for urea dialysis  
 NPO-14101 878-10241 05

**PRECONDITIONING**

- Tool simplifies weld preparation of aluminum  
 MSC-16992 878-10123 08

**PREDICTION ANALYSIS TECHNIQUES**

- Predicting rotor rotation noise  
 LANGLEY-12098 878-10406 06

**PREFORMS**

- Match-mold process for foam insulation  
 MSC-16631 878-10126 08

**PREPOLYMERS**

- Polyimide adhesives for titanium and composite bonding  
 LANGLEY-12257 878-10040 04

**PRESERVING**

- Mounting procedure for geological samples  
 MSC-18206 878-10327 03

**PRESSURE CHAMBERS**

- Compression testing of flammable liquids  
 MSC-16121 878-10548 06

**PRESSURE DISTRIBUTION**

- Hydraulic dynamic analysis  
 MSC-16795 878-10095 06  
 Tile-bonding tool  
 KSC-11053 878-10134 08

- Wing aerodynamics under blowing jets  
 LANGLEY-12256 878-10401 06

**PRESSURE MEASUREMENTS**

- Pressure-sensitive glass reaction cell  
 LANGLEY-11256 878-10223 04  
 Oxygen and nitrogen raman spectra  
 LEWIS-12849 878-10361 04  
 High-temperature microphone system  
 LANGLEY-12375 878-10384 06  
 Orifice calibration module  
 LANGLEY-12269 878-10393 06  
 Shock-swallowing air sensor  
 FRC-10107 878-10537 06  
 Dynamic measurement of bulk modulus  
 NPO-13226 878-10543 06

**PRESSURE REDUCTION**

- Dual relief-valve system  
 LANGLEY-12267 878-10111 07  
 Testing of three hot-air solar collectors  
 M-FS-23887 878-10201 03  
 Topping pressure for gas-storage cylinders  
 MSC-18186 878-10542 06

**PRESSURE REGULATORS**

- Magnetostriuctive valve  
 NPO-14235 878-10104 07  
 Precision fluid-pressure regulator  
 NPO-13370 878-10106 07

- Wide-temperature corrosion-resistant pressure regulator  
 NPO-13776 878-10274 07  
 Stable hydraulic pressure regulator  
 LEWIS-13058 878-10417 07

- Flow-compensating pressure regulator  
 LEWIS-12718 878-10522 05  
 Intraocular pressure reduction and regulation  
 LEWIS-12723 878-10523 05  
 Automatic bypass valve  
 LANGLEY-12063 878-10558 07  
 Adjustable gas-flow restrictor  
 MSC-19486 878-10560 07

**PRESSURE SENSORS**

- Remotely-powered intracranial pressure monitor  
 ARC-11120 878-10362 05  
 Electronically-scanned pressure measurement system  
 LANGLEY-12386 878-10394 06  
 Static-pressure probe for small geometries  
 LANGLEY-11552 878-10395 06  
 High-temperature capacitive pressure transducer  
 LEWIS-13078 878-10398 06  
 High-sampling-rate pressure transducer has in situ calibration  
 LANGLEY-12230 878-10536 06

**PRESSURE VESSELS**

- Compact pressure-line coupling  
 MSC-16893 878-10099 07  
 Dual relief-valve system  
 LANGLEY-12267 878-10111 07  
 Predicting damage from exploding vessels  
 LEWIS-13042 878-10258 06

**PRESTRESSING**

- Ultrasonic extensometer measures bolt preload  
 M-FS-19337 878-10271 07

**PRIMATES**

- Automatic primate feeder  
 LANGLEY-11586 878-10246 05

**PRIMERS (COATINGS)**

- Fast-drying coating  
 MSC-16056 878-10060 04

**PRINTED CIRCUITS**

- Fuseholders allow fast system checkout  
 MSC-16856 878-10088 06  
 Bench-top soldering aid for PC boards  
 MSC-16274 878-10121 08  
 'PC fabrication' for silicon solar-cell arrays  
 NPO-13991 878-10131 08  
 No-warp potted circuits  
 MSC-19729 878-10435 08  
 Circuit-lead trimming template  
 MSC-16589 878-10439 08

**PRISMS**

- Laser beam color separator  
 LANGLEY-11806 878-10174 03

**PROBES**

- Standardized gas-temperature probes  
 LEWIS-13059 878-10392 06

**PROBLEM SOLVING**

- Performance optimizing  
 LANGLEY-11930 878-10096 06  
 Body-fitted coordinates systems transformations  
 LANGLEY-12307 878-10147 09  
 Problems encountered in solar heating and cooling systems  
 M-FS-23974 878-10331 03

**PRODUCT DEVELOPMENT**

- CMOS-array design-automation techniques  
 M-FS-23762 878-10311 01

**PRODUCTION MANAGEMENT**

- Handbook for estimating fabrication costs  
 M-FS-23795 878-10140 08

**PRODUCTION PLANNING**

- Electrolysis cell stimulation  
 LEWIS-12740 878-10179 03

**PROGRAMMING LANGUAGES**

- Processor for the UNIVAC 1100 series  
 NPO-13469 878-10600 09

**PROJECT PLANNING**

- Price and cost estimation  
 M-FS-23812 878-10599 09

**PROJECTILES**

- Measuring projectile speed  
 LANGLEY-12387 878-10538 06

**PROPELLANT BINDERS**

- Low-temperature elastomer production and curing  
 NPO-13899 878-10346 04

**PROPELLANT DECOMPOSITION**

- Pressure-sensitive glass reaction cell  
 LANGLEY-11256 878-10223 04

**PROPELLANT TANKS**

- Predicting damage from exploding vessels  
 LEWIS-13042 878-10258 06

**PROPELLER DRIVE**

- Predicting rotor rotation noise  
 LANGLEY-12098 878-10406 06

**PROPULSION**

- SYSTEM CONFIGURATIONS**  
 Potential flows in propulsion system inlets  
 LEWIS-13010 878-10553 06

**PROSTHETIC DEVICES**

- Artificial leg with natural gait  
 M-FS-23225 878-10239 05  
 Biomedical applications of ion-beam technology  
 LEWIS-12807 878-10363 05

**PROTECTION**

- Housing protects laser in vacuum  
 GSFC-12241 878-10028 03  
 Simulator for training remote-manipulator operators  
 MSC-14921 878-10415 07

**PROTECTIVE COATINGS**

- Boron trifluoride coatings for plastics  
 ARC-11057 878-10043 04  
 Protective coating for laser diodes  
 LANGLEY-11746 878-10171 03  
 Improved alkali-metal/silicate binders  
 GSFC-12303 878-10224 04  
 Repairing silicon carbide coatings  
 MSC-18033 878-10226 04  
 Protective coating for copper in aluminum heat exchangers  
 M-FS-19334 878-10286 08  
 Embrittlement proof nickel-alloy bellows  
 M-FS-19331 878-10349 04  
 Predicting structures of cross-linked condensation polymers  
 NPO-14007 878-10352 04  
 Measurement of subcoat thickness by characteristic x-rays  
 MSC-16718 878-10505 04

**PROTOTYPES**

- Prototype solar-heating system-engineering analysis  
 M-FS-23910 878-10194 03



Prototype solar-heating system -  
 installation manual  
 M-FS-23907 B78-10195 03

**PROTRACTORS**  
 Combination force and angular-deflection  
 indicator  
 MSC-16155 B78-10070 06

**PUBLIC HEALTH**  
 Toxic substances handbook  
 LEWIS-13124 B78-10359 04  
 Medical Information Management  
 System  
 GSFC-12078 B78-10376 05

**PULLEYS**  
 Emergency escape device  
 M-FS-23235 B78-10270 07  
 Durable nonslip stainless-steel  
 drivebelts  
 GSFC-12276 B78-10567 07

**PULMONARY FUNCTIONS**  
 Microprocessor-based cardiopulmonary  
 monitor  
 MSC-18235 B78-10369 05

**PULSE CODE MODULATION**  
 Noise tolerant computer link  
 NPO-14152 B78-10160 02

**PULSE COMMUNICATION**  
 Noise tolerant computer link  
 NPO-14152 B78-10160 02

**PULSE DURATION**  
 Pulsed NMR spectroscopy  
 NPO-14023 B78-10175 03

**PULSE DURATION MODULATION**  
 Pulse-width-modulated attenuator for  
 AGC  
 NPO-14127 B78-10459 01

**PULSE GENERATORS**  
 Simple digital pulse-programing circuit  
 NPO-13747 B78-10299 01

**PULSE MODULATION**  
 Noncontact optical communication  
 between moving stations  
 LANGLEY-12283 B78-10377 06

**PULSED LASERS**  
 Low-background trace-gas detector  
 NPO-13683 B78-10168 03

**PULSES**  
 Simple digital pulse-programing circuit  
 NPO-13747 B78-10299 01

**PUMPS**  
 Pump efficiency in solar-energy  
 systems  
 M-FS-23934 B78-10213 03  
 Solar-powered hot-water system  
 NPO-14270 B78-10324 03  
 Stable hydraulic pressure regulator  
 LEWIS-13058 B78-10417 07  
 Drag-pump rotating filter  
 MSC-16180 B78-10563 07

**PUNCHES**  
 Form die and glide plates for vacuum  
 brazing  
 MSC-16549 B78-10113 08

**PURGING**  
 Internal grid for release of brazing  
 retorts  
 MSC-19472 B78-10114 08  
 Deaerating high-viscosity silicon rubber  
 MSC-16694 B78-10514 04

**PURIFICATION**  
 Corona-discharge air-purification system  
 ARC-10975 B78-10350 04  
 Low-temperature refining of coal  
 NPO-14210 B78-10511 04  
 Accelerated purification of colloidal silica  
 sols  
 MSC-16793 B78-10512 04

**PYRANOMETERS**  
 Voice-output solar energy reporter  
 LEWIS-12947 B78-10022 02

**PYRITES**  
 Coal desulfurization with iron  
 pentacarbonyl  
 NPO-14272 B78-10342 04

**PYROLYSIS**  
 Chemical-vapor deposition of silicon from  
 silane  
 NPO-14403 B78-10502 03

**PYROMETALLURGY**  
 Model of silicon production in a  
 fluidized-bed reactor  
 NPO-14404 B78-10520 04

**Q**

**QUALITY CONTROL**  
 Automated tester for MOS devices  
 NPO-14088 B78-10001 01  
 Measuring oxide trapping parameters in  
 MOS structure  
 NPO-14120 B78-10002 01  
 Curve tracer checks CMOS IC's  
 GSFC-12209 B78-10007 01  
 Window flaw detection by backscatter  
 lighting  
 MSC-16605 B78-10089 06  
 Reclaiming hybrid integrated circuits  
 MSC-16463 B78-10129 08  
 Water sample-collection and distribution  
 system  
 MSC-16841 B78-10235 05  
 Precise matching of diodes  
 NPO-14293 B78-10452 01  
 SEM probe of IC radiation sensitivity  
 NPO-14350 B78-10541 06  
 Automated inspection of wire-frame  
 assemblies  
 GSFC-12321 B78-10546 06

**R**

**RADAR**  
 Air-traffic surveillance systems  
 NPO-14173 B78-10313 02

**RADAR EQUIPMENT**  
 Miniature Ku-Band down converter  
 MSC-18313 B78-10450 01

**RADIANT COOLING**  
 Modular heat-pipe-radiator panel  
 MSC-16625 B78-10328 03

**RADIATION**  
 Finding radiant-energy sources  
 GSFC-12147 B78-10159 02

**RADIATION DETECTORS**  
 Low-intensity x-ray and gamma-ray  
 imaging device  
 GSFC-12263 B78-10061 05  
 Inexpensive, portable, integrating solar  
 energy meter  
 LEWIS-12804 B78-10188 03  
 Stacked solar cells measure X-ray  
 exposure  
 NPO-13954 B78-10243 05

**RADIATION DISTRIBUTION**  
 Improved conical solar concentrator  
 NPO-13825 B78-10187 03  
 Compact antenna has symmetrical  
 radiation pattern  
 ARC-11189 B78-10473 02

**RADIATION DOSAGE**  
 Low-intensity x-ray and gamma-ray  
 imaging device  
 GSFC-12263 B78-10061 05  
 Improved control of medical x-ray film  
 exposure  
 NPO-13808 B78-10063 05  
 Stacked solar cells measure X-ray  
 exposure  
 NPO-13954 B78-10243 05

**RADIATION HARDENING**  
 SEM probe of IC radiation sensitivity  
 NPO-14350 B78-10541 06

**RADIATION HAZARDS**  
 Simulator for training  
 remote-manipulator operators  
 MSC-14921 B78-10415 07

**RADIATION MEASUREMENT**  
 Inexpensive, portable, integrating solar  
 energy meter  
 LEWIS-12804 B78-10188 03

**RADIATION MEASURING INSTRUMENTS**  
 Stacked solar cells measure X-ray  
 exposure  
 NPO-13954 B78-10243 05  
 Improved nucleonic coal-thickness  
 monitor  
 M-FS-23725 B78-10344 04

**RADIATION PROTECTION**  
 Electrically-conducting thermal-control  
 coating  
 GSFC-12207 B78-10044 04  
 Microwave-beam safety subsystem  
 NPO-14224 B78-10317 02

**RADIATION SHIELDING**  
 Electrically-conducting thermal-control  
 coating  
 GSFC-12207 B78-10044 04

**RADIATION SOURCES**  
 Finding radiant-energy sources  
 GSFC-12147 B78-10159 02

**RADIATIVE HEAT TRANSFER**  
 Orbital heat rate package  
 M-FS-23980 B78-10554 06

**RADIO ANTENNAS**  
 Human arm may act as antenna  
 ARC-11195 B78-10161 02

**RADIO COMMUNICATION**  
 Human arm may act as antenna  
 ARC-11195 B78-10161 02

**RADIO EQUIPMENT**  
 High-power RF switch  
 NPO-14229 B78-10151 01

**RADIO FREQUENCIES**  
 High-power RF switch  
 NPO-14229 B78-10151 01

**RADIO FREQUENCY INTERFERENCE**  
 Portable spark-gap arc generator  
 LEWIS-12886 B78-10008 01  
 Finding radiant-energy sources  
 GSFC-12147 B78-10159 02  
 Automatic radio-transmission monitor  
 NPO-13941 B78-10165 02

**RADIO INTERFEROMETERS**  
 Real-time monitoring of crustal  
 deformations  
 NPO-14124 B78-10034 03

**RADIO RECEIVERS**  
 Narrow-bandwidth receiver  
 GSFC-12142 B78-10463 02  
 Wideband digital spectrum analyzer  
 NPO-14394 B78-10468 02

**RADIO RELAY SYSTEMS**  
 Preventing radio-paging system tieup  
 MSC-19696 B78-10024 02

**RADIO SIGNALS**

Automatic acquisition and ranging system  
NPO-13982 878-10312 02  
Measuring radio-signal power accurately  
NPO-13373 878-10464 02

**RADIO SPECTRA**

Wideband digital spectrum analyzer  
NPO-14394 878-10468 02

**RADIO TRANSMISSION**

Automatic radio-transmission monitor  
NPO-13941 878-10165 02  
Implementing OQASK by using MSK  
NPO-13896 878-10309 01  
More efficient microwave-power transmission  
NPO-13885 878-10466 02

**RADIO TRANSMITTERS**

Multichannel VCO needs only one reference  
MSC-18225 878-10448 01

**RADIOGRAPHY**

Low-intensity x-ray and gamma-ray imaging device  
GSFC-12263 878-10061 05  
Improved control of medical x-ray film exposure  
NPO-13808 878-10063 05  
Film adhesive enhances neutron radiographic images  
MSC-18061 878-10081 06  
Improved epoxy adhesive with radiographic tracer  
MSC-18020 878-10225 04  
Stacked solar cells measure X-ray exposure  
NPO-13954 878-10243 05  
Detecting moisture in composite honeycomb panels  
MSC-16750 878-10550 06  
Detecting overpenetration of electron-beam welds  
M-FS-19396 878-10586 08

**RADIOLOGY**

Improved control of medical x-ray film exposure  
NPO-13808 878-10063 05

**RADIOMETERS**

Calibration target for temperature radiometer  
LANGLEY-12239 878-10083 06  
Cosine-corrected optical diffuser  
NPO-14288 878-10322 03  
Estimating regional heat flux from scanning radiometer data  
LANGLEY-12158 878-10329 03

**RADIOTELEPHONES**

Preventing radio-paging system tieup  
MSC-19696 878-10024 02

**RADOMES**

Efficient rectifying antenna  
NPO-13884 878-10471 02

**RAIL TRANSPORTATION**

Heat resistant nontoxic laminate  
ARC-11040 878-10356 04

**RAMAN SPECTRA**

Oxygen and nitrogen raman spectra  
LEWIS-12849 878-10361 04

**RANDOM SIGNALS**

Hybrid random-sound test-control system  
NPO-13900 878-10025 02

**RATINGS**

Low-chromium stainless steels  
LEWIS-12543 878-10046 04

**RATS**

Retainer for laboratory animals  
LANGLEY-12353 878-10371 05

**REACTION KINETICS**

Model of silicon production in a fluidized-bed reactor  
NPO-14404 878-10520 04

**RECEIVERS**

Wideband EMG telemetry system  
ARC-11209 878-10375 05  
Miniature Ku-Band down converter  
MSC-18313 878-10450 01  
Narrow-bandwidth receiver  
GSFC-12142 878-10463 02  
Determining the response of an FM receiver  
MSC-16751 878-10465 02

**RECORDING INSTRUMENTS**

High-resolution gray-scale recorder  
LEWIS-12783 878-10017 02

**RECORDS**

Medical Information Management System  
GSFC-12078 878-10376 05

**RECOVERY PARACHUTES**

Scale parachute fabrication  
M-FS-23139 878-10141 08

**RECTIFIERS**

Precise matching of diodes  
NPO-14293 878-10452 01  
Efficient rectifying antenna  
NPO-13884 878-10471 02

**RECTUM**

Improved probe for rectal-cancer detection  
NPO-14247 878-10531 05  
Self-propelling, self-locating colonoscope  
NPO-14092 878-10532 05

**REDUNDANCY**

Verification of redundancy management design  
MSC-16713 878-10145 09  
Model for redundant-sensor signal errors  
MSC-16715 878-10146 09

**REDUNDANCY ENCODING**

Detecting and correcting bit errors on magnetic tape  
NPO-13842 878-10294 09

**REDUNDANT COMPONENTS**

Verification of redundancy management design  
MSC-16713 878-10145 09  
Model for redundant-sensor signal errors  
MSC-16715 878-10146 09  
Synchronous transfer circuits for redundant systems  
NPO-14162 878-10157 01  
Computation of spare parts requirements  
MSC-16872 878-10593 09

**REENTRY EFFECTS**

Tumbling-vehicle entry heating  
M-FS-23712 878-10555 06

**REENTRY SHIELDING**

Coated-felt thermal insulation  
MSC-12737 878-10510 04

**REFINING**

Coal desulfurization with iron pentacarbonyl  
NPO-14272 878-10342 04  
Zone-refining encapsulated semiconductors  
M-FS-23902 878-10351 04

Low-temperature refining of coal  
NPO-14210 878-10511 04  
Accelerated purification of colloidal silica sols  
MSC-16793 878-10512 04  
Model of silicon production in a fluidized-bed reactor  
NPO-14404 878-10520 04

**REFLECTANCE**

Ion-beam texturing of materials  
LEWIS-12996 878-10357 04

**REFLECTION**

Improved conical solar concentrator  
NPO-13825 878-10187 03

**REFLECTOMETERS**

Laser beam color separator  
LANGLEY-11806 878-10174 03  
Instrument measures many optical properties in visible and IR  
LANGLEY-12285 878-10489 03

**REFLECTORS**

High-vacuum, low-temperature bond for second-surface mirrors  
M-FS-23405 878-10124 08  
Optimizing multislot feeds for reflecting antennas  
NPO-14064 878-10314 02  
Zone-refining encapsulated semiconductors  
M-FS-23902 878-10351 04  
Lightweight conical antenna reflector  
NPO-13552 878-10472 02

**REFRACTION**

Ocean-wave ray or crest diagrams in shoaling waters  
LANGLEY-12380 878-10341 03

**REFRACTIVITY**

Protective coating for laser diodes  
LANGLEY-11746 878-10171 03

**REFRIGERATING MACHINERY**

Refrigerant leak detector  
MSC-18214 878-10551 06

**REFRIGERATORS**

Thermal compensator for helium refrigerators  
GSFC-12168 878-10082 06  
Practical and efficient magnetic heat pump  
LEWIS-12508 878-10170 03

**REGENERATORS**

Dynamic braking of bidirectional motors  
ARC-11194 878-10578 07

**REGULATORS**

Precision fluid-pressure regulator  
NPO-13370 878-10106 07  
Power-switch dV/dt sensing  
MSC-16707 878-10307 01  
Voltage regulator for solar panels  
NPO-13895 878-10478 03

**REINFORCING FIBERS**

Ultrafine PBI fibers and yarns  
ARC-11221 878-10504 04

**REJECTION**

S-Band complex-weight module for adaptive processing  
LANGLEY-12197 878-10005 01  
Biocompatibility of surgical implants  
NPO-14291 878-10368 05

**RELIABILITY**

Verification of redundancy management design  
MSC-16713 878-10145 09  
Model for redundant-sensor signal errors  
MSC-16715 878-10146 09  
Shock during PIND test frees particles  
M-FS-23829 878-10389 06

- Electric and hybrid vehicles  
LEWIS-13077 B78-10423 07  
Circuit-lead trimming template  
MSC-16589 B78-10439 08  
Low partial discharge vacuum  
feedthrough  
GSFC-12347 B78-10559 07  
Reducing stickiness of elastomer valve  
seals  
LANGLEY-11778 B78-10565 07
- RELIEF VALVES**  
Dual relief-valve system  
LANGLEY-12267 B78-10111 07  
Air cushion landing system  
LANGLEY-12303 B78-10259 06
- REMOTE CONSOLES**  
28-Bit serial word simulator/monitor  
MSC-16418 B78-10315 02
- REMOTE HANDLING**  
Computer interface for mechanical arm  
M-FS-23849 B78-10015 02  
Simulator for training  
remote-manipulator operators  
MSC-14921 B78-10415 07
- REMOTE SENSORS**  
Optical traffic-sensing concept  
NPO-13603 B78-10021 02  
Automated syringe sampler  
LANGLEY-12308 B78-10374 05  
Thermoelectrically-cooled variable-tem-  
perature probe  
MSC-18192 B78-10484 03  
Self-propelling, self-locating  
colonoscope  
NPO-14092 B78-10532 05
- REMOVAL**  
Adhesive-removal tool  
MSC-19498 B78-10279 07  
Drag-pump rotating filter  
MSC-16180 B78-10563 07  
Compact bypass-flow filter  
MSC-18311 B78-10564 07
- REPLACING**  
Spares-optimized model  
MSC-18015 B78-10446 09
- REPLENISHMENT**  
Spares-optimized model  
MSC-18015 B78-10446 09
- REPLICAS**  
Fabrication of sea-floor models  
NPO-13554 B78-10295 09
- REPORT GENERATORS**  
Voice-output solar energy reporter  
LEWIS-12947 B78-10022 02
- REPRESENTATIONS**  
Body-fitted coordinates systems  
transformations  
LANGLEY-12307 B78-10147 09
- RESIDUAL GAS**  
Mass spectrometer calibration standard  
NPO-14097 B78-10249 06
- RESIDUAL STRESS**  
Ultra-high-strength boron fibers  
LEWIS-12739 B78-10051 04
- RESIN BONDING**  
New adhesive withstands temperature  
extremes  
GSFC-12345 B78-10042 04
- RESINS**  
Fire-resistant wood composites  
ARC-11174 B78-10508 04
- RESISTANCE HEATING**  
Temperature stabilization of microwave  
ferrite devices  
MSC-16833 B78-10152 01
- RESISTANCE THERMOMETERS**  
Calibration target for temperature  
radiometer  
LANGLEY-12239 B78-10083 06
- RESONANT FREQUENCIES**  
Calculation of planar-truss modal  
frequencies  
LANGLEY-12137 B78-10382 06
- RESONATORS**  
Ruby c-axis alignment system  
NPO-14252 B78-10379 06  
Low-power tuner for lasers  
M-FS-23863 B78-10486 03
- RESOURCES**  
Postprocessing classification images  
MSC-18238 B78-10601 09
- RESOURCES MANAGEMENT**  
Multiple-input land-use system concept  
NPO-13903 B78-10018 02
- RESPIRATION**  
Hand-held vital-signals monitor  
MSC-18232 B78-10524 05  
Hybrid respiration-signal conditioner  
MSC-18226 B78-10527 05  
Hybrid heart/breath-rate processor  
MSC-18227 B78-10528 05
- RETAINING**  
Retainer for laboratory animals  
LANGLEY-12353 B78-10371 05  
Quick locking/unlocking retainer  
MSC-18048 B78-10408 07
- RIBBON PARACHUTES**  
Scale parachute fabrication  
M-FS-23139 B78-10141 08
- RIGID MOUNTING**  
Vibration-free thermal link  
GSFC-12297 B78-10169 03
- RIVETED JOINTS**  
High-strength blind rivet  
LANGLEY-12154 B78-10287 08
- RIVETS**  
High-strength blind rivet  
LANGLEY-12154 B78-10287 08  
Riveting-force gage  
NPO-13477 B78-10432 08  
Fastener for thin fragile  
materials  
MSC-18097 B78-10436 08
- ROBOTS**  
Self-navigating robot  
NPO-14190 B78-10026 02
- ROCKS**  
Mounting procedure for geological  
samples  
MSC-18206 B78-10327 03
- RODS**  
Vacuum leadthrough for hydrogen  
maser  
NPO-14148 B78-10422 07
- ROLLER BEARINGS**  
Thermal performance of shaft bearing  
system  
LEWIS-12761 B78-10263 06
- ROLLING MOMENTS**  
Aircraft trailing vortex hazard alleviators  
LANGLEY-12034 B78-10272 07
- ROTARY STABILITY**  
Improved notation controller  
GSFC-12273 B78-10383 06
- ROTARY WINGS**  
Predicting rotor rotation noise  
LANGLEY-12098 B78-10406 06
- ROTATING BODIES**  
Improved notation controller  
GSFC-12273 B78-10383 06
- ROTATING SHAFTS**  
Shaft speed control  
NPO-14170 B78-10416 07
- Two (or more) rotary outputs from one  
input  
MSC-19450 B78-10568 07
- ROTATION**  
Transmitting rotary motion at an angle  
MSC-19483 B78-10561 07
- ROTOR BLADES**  
Gas-path seal material  
LEWIS-12623 B78-10347 04
- ROTOR BLADES (TURBOMACHINERY)**  
Edge geometry of turbomachine blades  
LEWIS-12979 B78-10262 06
- ROTORS**  
Predicting rotor rotation noise  
LANGLEY-12098 B78-10406 06
- RUBBER**  
Chemical agent boosts natural-rubber  
output  
NPO-14185 B78-10358 04  
No-warp potted circuits  
MSC-19729 B78-10435 08  
Reducing stickiness of elastomer valve  
seals  
LANGLEY-11778 B78-10565 07
- RUBY**  
Ruby c-axis alignment system  
NPO-14252 B78-10379 06
- RUDDERS**  
Spring control of wire harness loops  
MSC-18246 B78-10411 07
- RUNGE-KUTTA METHOD**  
Solar-electric geocentric transfer  
LEWIS-12939 B78-10403 06
- RUSTING**  
Corrosion inhibitors for solar-heating and  
cooling  
M-FS-25023 B78-10501 03
- RUTHENIUM COMPOUNDS**  
Solar photolysis of water  
NPO-14126 B78-10049 04

## S

## SAFETY

- Microwave-beam safety subsystem  
NPO-14224 B78-10317 02  
Heat resistant nontoxic laminate  
ARC-11040 B78-10356 04  
Simulator for training  
remote-manipulator operators  
MSC-14921 B78-10415 07  
Fire-resistant wood composites  
ARC-11174 B78-10508 04
- SAFETY DEVICES**  
Cryostat safety tent  
GSFC-12206 B78-10080 06  
Modified pipe extension safely releases  
chain binders  
MSC-16937 B78-10103 07  
Penetrating fire extinguisher  
KSC-11064 B78-10397 06
- SAFETY MANAGEMENT**  
Infrared-enhanced TV for fire detection  
M-FS-19380 B78-10172 03  
Toxic substances handbook  
LEWIS-13124 B78-10359 04  
Directory of fire research specialists  
LEWIS-13123 B78-10399 06
- SAMPLERS**  
Biological sampling and cleaning device  
NPO-14010 B78-10245 05  
Automated syringe sampler  
LANGLEY-12308 B78-10374 05  
Safe, durable soil sampler  
MSC-18171 B78-10577 07

**SAMPLES**

Simple air-piston gas-sampling system  
LEWIS-12922 B78-10110 07

**SAMPLING**

Rapid measurement of bacteria in water  
GSFC-12158 B78-10232 05  
Monitoring systems for community water supplies  
MSC-16778 B78-10233 05  
Water sample-collection and distribution system  
MSC-16841 B78-10235 05  
Device for pitching off metal tubes  
GSFC-12274 B78-10410 07  
High-sampling-rate pressure transducer has in situ calibration  
LANGLEY-12230 B78-10536 06

**SANDWICH STRUCTURES**

Inspection of adhesive-bonded radiators  
MSC-18062 B78-10125 08  
Testing composite sheets at high temperatures  
MSC-16237 B78-10252 06  
Friction of thick laminates  
LANGLEY-12010 B78-10284 08  
Void-free bends in laminated structures  
MSC-16998 B78-10285 08

**SATELLITE SOLAR POWER STATIONS**

Microwave-beam safety subsystem  
NPO-14224 B78-10317 02

**SCALE (RATIO)**

Calibration method for an ultrasonic gray-scale recorder  
LEWIS-12782 B78-10016 02  
High-resolution gray-scale recorder  
LEWIS-12783 B78-10017 02  
Test-vehicle cycle programmer  
LEWIS-12977 B78-10020 02

**SCANNING**

Ultrasonic evaluation of high-voltage circuit boards  
LEWIS-12781 B78-10087 06  
Energy conservation, using remote thermal scanning  
LEWIS-12812 B78-10178 03

**SCRAMBLING (COMMUNICATION)**

Video scrambler/descrambler  
MSC-16843 B78-10013 02

**SCRAPERS**

Adhesive-removal tool  
MSC-19498 B78-10279 07

**SCREWS**

Nylon screws make inexpensive coil forms  
MSC-16912 B78-10003 01  
Ultrasonic extensometer measures bolt preload  
M-FS-19337 B78-10271 07  
Antibackoff lock for nuts and bolts  
MSC-16472 B78-10409 07

**SEA ROUGHNESS**

Fabrication of sea-floor models  
NPO-13554 B78-10295 09

**SEALING**

Device for pitching off metal tubes  
GSFC-12274 B78-10410 07  
Sealing microcircuits with adhesives  
M-FS-23869 B78-10592 08

**SEALS (STOPPERS)**

Gas-path seal material  
LEWIS-12623 B78-10347 04  
High-pressure cryogenic cylinder seal  
M-FS-19335 B78-10421 07  
Ceramic-to-metal vacuum seal  
NPO-13803 B78-10437 08

Multiple-sample holder for IC testing  
NPO-14314 B78-10540 06  
Coating for hot sliding seals  
MSC-16529 B78-10562 07  
Reducing stickiness of elastomer valve seals  
LANGLEY-11778 B78-10565 07  
Metallic thermal seal  
MSC-18135 B78-10566 07

**SECONDARY EMISSION**

Ion-beam-textured graphite  
LEWIS-12724 B78-10506 04

**SEGMENTS**

Hydraulic dynamic analysis  
MSC-16795 B78-10095 06

**SEMICONDUCTOR DEVICES**

Automated tester for MOS devices  
NPO-14088 B78-10001 01  
Analyzing CMOS/SOS fabrication for LSI arrays  
M-FS-23788 B78-10158 01  
High-Speed, high-power, switching transistor  
LEWIS-13021 B78-10298 01  
Zone-refining encapsulated semiconductors  
M-FS-23902 B78-10351 04  
Precise matching of diodes  
NPO-14293 B78-10452 01

**SEMICONDUCTOR LASERS**

Thermal compensator for helium refrigerators  
GSFC-12168 B78-10082 06

**SEMICONDUCTORS (MATERIALS)**

Low partial discharge vacuum feedthrough  
GSFC-12347 B78-10559 07

**SENSITIVITY**

Directional laser velocimeter with doppler velocity simulator  
LANGLEY-12176 B78-10029 03

**SEPARATORS**

Improvements in microelectrophoresis apparatus  
ARC-11121 B78-10247 05

**SEQUENCING**

High-rise foam-in-place process  
MSC-16931 B78-10128 08

**SERVOCONTROL**

Improved servocontrol system  
M-FS-19358 B78-10150 01  
Detecting servo failures with software  
FRC-11003 B78-10396 06  
Improved servo for a michaelson interferometer  
NPO-14093 B78-10488 03

**SERVOMECHANISMS**

Pneumatic servomechanisms  
M-FS-23295 B78-10144 08

**SETUPS**

Simplified tooling for spray masking  
MSC-16927 B78-10136 08

**SHAFTS (MACHINE ELEMENTS)**

Design of transmission shafting  
LEWIS-12965 B78-10107 07  
Thermal performance of shaft bearing system  
LEWIS-12761 B78-10263 06  
Shaft speed control  
NPO-14170 B78-10416 07  
Two-position wax-motor rotary actuator  
GSFC-12521 B78-10557 07  
Two (or more) rotary outputs from one input  
MSC-19450 B78-10568 07

**SHAKERS**

Microcircuit-cleaning machine  
MSC-16060 B78-10292 08

**SHAPES**

Form die and glide plates for vacuum brazing  
MSC-16549 B78-10113 08

**SHEAR FLOW**

Plotting shear-flow forces  
MSC-18013 B78-10445 09

**SHEAR STRENGTH**

Quick-and-easy shear-load testing  
MSC-16765 B78-10073 06

**SHEAR STRESS**

Quick-and-easy shear-load testing  
MSC-16765 B78-10073 06

**SHELLS (STRUCTURAL FORMS)**

Ladle for pouring hot melt  
MSC-16974 B78-10137 08

**SHIELDING**

Splicing shielded cables  
MSC-18297 B78-10453 01

**SHIFT REGISTERS**

Data reformatting with less hardware  
NPO-13676 B78-10470 02

**SHOCK ABSORBERS**

Vibration-free thermal link  
GSFC-12297 B78-10169 03  
Low-frequency vibration isolation  
NPO-13915 B78-10275 07  
Bend-absorbing clamp  
MSC-16971 B78-10575 07

**SHOCK WAVES**

Shock-swallowing air sensor  
FRC-10107 B78-10537 06

**SHORT CIRCUITS**

Electrical-ground monitor  
MSC-18281 B78-10455 01

**SHOT PEENING**

Processing high-strength steel alloys  
MSC-16172 B78-10441 08

**SIGNAL ANALYSIS**

Hybrid random-sound test-control system  
NPO-13900 B78-10025 02  
Wideband digital spectrum analyzer  
NPO-14394 B78-10468 02

**SIGNAL DETECTION**

High-resolution gray-scale recorder  
LEWIS-12783 B78-10017 02  
Simplified phase detector  
NPO-13395 B78-10457 01

**SIGNAL DETECTORS**

Narrow-bandwidth receiver  
GSFC-12142 B78-10463 02  
Hybrid heart/breath-rate processor  
MSC-18227 B78-10528 05

**SIGNAL ENCODING**

Video scrambler/descrambler  
MSC-16843 B78-10013 02  
Simplified data compressor  
NPO-14041 B78-10023 02  
Efficient digital encoding scheme  
MSC-18267 B78-10467 02

**SIGNAL GENERATORS**

Three-function signal generator  
MSC-16672 B78-10306 01

**SIGNAL MEASUREMENT**

Measuring radio-signal power accurately  
NPO-13373 B78-10464 02

**SIGNAL PROCESSING**

Automatic gain-balancing circuit  
LANGLEY-12074 B78-10297 01  
Hybrid ECG signal conditioner  
MSC-18230 B78-10526 05

**SIGNAL STABILIZATION**

Chopper-stabilized phase detector  
MSC-16461 B78-10163 02

**SIGNAL TO NOISE RATIOS**

Noise tolerant computer link  
NPO-14152 B78-10160 02  
Measuring radio-signal power accurately  
NPO-13373 B78-10464 02

**SIGNAL TRANSMISSION**

Implementing OQASK by using MSK  
NPO-13896 B78-10309 01  
Eliminating ambiguity in digital signals  
NPO-14289 B78-10469 02

**SILANES**

Abrasion-resistant antireflective coating for polycarbonate  
ARC-11047 B78-10054 04  
Chemical-vapor deposition of silicon from silane  
NPO-14403 B78-10502 03  
Model of silicon production in a fluidized-bed reactor  
NPO-14404 B78-10520 04

**SILICATES**

Improved alkali-metal/silicate binders  
GSFC-12303 B78-10224 04

**SILICON**

Low-cost high purity production  
NPO-14198 B78-10050 04  
Inexpensive, portable, integrating solar energy meter  
LEWIS-12804 B78-10188 03  
Thin silicon-solar cell fabrication  
NPO-14047 B78-10325 03  
Process for growing thin polished silicon sheets  
NPO-14172 B78-10434 08  
Chemical-vapor deposition of silicon from silane  
NPO-14403 B78-10502 03  
Model of silicon production in a fluidized-bed reactor  
NPO-14404 B78-10520 04  
Controlling the growth of silicon sheets  
NPO-14295 B78-10581 08  
Automated control of crystal growth  
NPO-14420 B78-10582 08

**SILICON CARBIDES**

Brazed boron-silicon carbide/aluminum structural panels  
LANGLEY-12244 B78-10221 04  
Repairing silicon carbide coatings  
MSC-18033 B78-10226 04

**SILICON COMPOUNDS**

Low-cost high purity production  
NPO-14198 B78-10050 04

**SILICON DIOXIDE**

High-temperature brazing of stainless steel  
MSC-19459 B78-10112 08  
High-temperature waterproofing for tiles  
MSC-16773 B78-10135 08  
High-temperature capacitive pressure transducer  
LEWIS-13078 B78-10398 06  
Accelerated purification of colloidal silica sols  
MSC-16793 B78-10512 04

**SILICONE RESINS**

Cure-rate data for silicone adhesive  
GSFC-12330 B78-10057 04

**SILICONE RUBBER**

No-warp potted circuits  
MSC-19729 B78-10435 08

Deaerating high-viscosity silicon rubber  
MSC-16694 B78-10514 04

**SILICONES**

Flame-retardant adhesive tape  
MSC-16721 B78-10041 04  
Cure-rate data for silicone adhesive  
GSFC-12330 B78-10057 04

**SILVER CADMIUM BATTERIES**

Continuous process fabricates battery plaque  
GSFC-12054 B78-10132 08

**SIMULATION**

Multipurpose system simulator  
GSFC-12333 B78-10444 09

**SIMULATORS**

Directional laser velocimeter with doppler velocity simulator  
LANGLEY-12176 B78-10029 03  
Approach and landing simulation  
LANGLEY-12060 B78-10091 06  
28-Bit serial word simulator/monitor  
MSC-16418 B78-10315 02  
Simulator for training remote-manipulator operators  
MSC-14921 B78-10415 07  
Solar simulator test facility  
M-FS-23972 B78-10477 03

**SINGLE CRYSTALS**

Precision cleaver for 'soft' crystals  
GSFC-12291 B78-10348 04

**SINTERING**

Slurry-powder sintering furnace  
LANGLEY-11423 B78-10293 08

**SIZE DETERMINATION**

Resizing algorithm for loaded structures  
LANGLEY-12064 B78-10594 09

**SIZE SEPARATION**

Compact bypass-flow filter  
MSC-18311 B78-10564 07

**SKIN (ANATOMY)**

Sweat collection capsule  
ARC-11031 B78-10367 05

**SKIN GRAFTS**

Bacillus cereus strain MCN as a debridging agent  
LANGLEY-12287 B78-10067 05

**SKY RADIATION**

Optics for natural lighting  
LANGLEY-12333 B78-10189 03

**SLICING**

Precision cleaver for 'soft' crystals  
GSFC-12291 B78-10348 04

**SLIPSTREAMS**

WAKE and WASH  
LANGLEY-12262 B78-10093 06

**SLURRIES**

Continuous process fabricates battery plaque  
GSFC-12054 B78-10132 08  
Slurry-powder sintering furnace  
LANGLEY-11423 B78-10293 08

**SMOKE ABATEMENT**

Fire-and smoke-retardant polyesters and elastomers  
NPO-14053 B78-10058 04

**SODIUM**

Low-cost high purity production  
NPO-14198 B78-10050 04

**SOL-GEL PROCESSES**

Predicting structures of cross-linked condensation polymers  
NPO-14007 B78-10352 04

**SOLAR ARRAYS**

'PC fabrication' for silicon solar-cell arrays  
NPO-13991 B78-10131 08

Universal test fixture for solar cells  
NPO-14062 B78-10184 03

**SOLAR CELLS**

Glass tubes for protecting solar cells  
NPO-14200 B78-10031 03  
Double-sided solar-cell package  
NPO-14199 B78-10033 03  
Solar-energy bibliography  
M-FS-23823 B78-10037 03  
Low-cost high purity production  
NPO-14198 B78-10050 04  
'PC fabrication' for silicon solar-cell arrays  
NPO-13991 B78-10131 08  
Universal test fixture for solar cells  
NPO-14062 B78-10184 03  
Accelerated-weathering test-system for solar cells  
NPO-14061 B78-10185 03  
Automated solar-cell-array assembly machine  
NPO-13652 B78-10186 03  
Terrestrial photovoltaic measurements  
LEWIS-13057 B78-10310 01  
Thin silicon-solar cell fabrication  
NPO-14047 B78-10325 03  
Power loss for high-voltage solar-cell arrays  
LEWIS-12865 B78-10340 03  
Photovoltaic systems test facility  
LEWIS-13073 B78-10378 06  
Process for growing thin polished silicon sheets  
NPO-14172 B78-10434 08  
Improved method of solar-cell assembly  
LEWIS-12729 B78-10438 08  
More efficient GaAs solar cells  
LANGLEY-12216 B78-10479 03  
Chemical-vapor deposition of silicon from silane  
NPO-14403 B78-10502 03  
Automated control of crystal growth  
NPO-14420 B78-10582 08

**SOLAR COLLECTORS**

High-temperature solar converter  
GSFC-12234 B78-10032 03  
Solar-energy bibliography  
M-FS-23823 B78-10037 03  
Automated solar-cell-array assembly machine  
NPO-13652 B78-10186 03  
Prototype air flat-plate solar collector  
M-FS-23893 B78-10199 03  
Flat-plate solar collector - installation package  
M-FS-23921 B78-10200 03  
Testing of three hot-air solar collectors  
M-FS-23887 B78-10201 03  
Thermal performance of a hot-air solar collector  
M-FS-23891 B78-10202 03  
Performance and structural tests of hot-air solar collectors  
M-FS-23911 B78-10203 03  
Thermal performance of a hot-air solar collector  
M-FS-23924 B78-10204 03  
Flat-plate liquid solar collector  
M-FS-23912 B78-10205 03  
Performance evaluations of a liquid solar collector  
M-FS-23931 B78-10206 03  
Indoor and outdoor tests of a liquid solar collector  
M-FS-23886 B78-10207 03

- Thermal performance of a flat-plate liquid solar collector  
M-FS-23890 878-10208 03
- Performance of black-nickel and black-chrome solar collectors  
M-FS-23888 878-10210 03
- Glass solar collector - materials assessment  
M-FS-23926 878-10212 03
- Natural-oxide solar-collector coatings  
M-FS-23518 878-10326 03
- Hot-air flat-plate solar collector-design package  
M-FS-23941 878-10335 03
- Evaluation of an air solar collector  
M-FS-23978 878-10336 03
- Indoor tests of a hot-air solar collector  
M-FS-23954 878-10337 03
- Performance evaluation of an air solar collector  
M-FS-23968 878-10338 03
- Outdoor tests of a liquid solar collector  
M-FS-23969 878-10339 03
- Convectively cooled structures  
LANGLEY-12347 878-10404 06
- Design and installation of a flat-plate solar collector  
M-FS-25010 878-10498 03
- SOLAR ELECTRIC PROPULSION**
- Solar-electric geocentric transfer  
LEWIS-12939 878-10403 06
- SOLAR ENERGY**
- Voice-output solar energy reporter  
LEWIS-12947 878-10022 02
- Double-sided solar-cell package  
NPO-14199 878-10033 03
- Solar-energy bibliography  
M-FS-23823 878-10037 03
- Solar photolysis of water  
NPO-14126 878-10049 04
- Prototype solar-heating system  
M-FS-23916 878-10180 03
- Residential solar-heating system  
M-FS-23909 878-10181 03
- Programmable controller for solar heating  
M-FS-23915 878-10183 03
- Universal test fixture for solar cells  
NPO-14062 878-10184 03
- Accelerated-weathering test-system for solar cells  
NPO-14061 878-10185 03
- Automated solar-cell-array assembly machine  
NPO-13652 878-10186 03
- Inexpensive, portable, integrating solar energy meter  
LEWIS-12804 878-10188 03
- Selection standard for FEP films for solar energy  
MSC-16999 878-10190 03
- Prototype residential solar-energy system  
M-FS-23932 878-10191 03
- Prototype residential solar-energy system-engineering analysis  
M-FS-23929 878-10192 03
- Residential solar-heating system - design brochure  
M-FS-23933 878-10193 03
- Prototype solar-heating system-engineering analysis  
M-FS-23910 878-10194 03
- Prototype solar-heating system - installation manual  
M-FS-23907 878-10195 03
- Solar-heating module  
M-FS-23925 878-10196 03
- Passive heat exchanger for solar heating  
M-FS-23914 878-10197 03
- Passive heat exchanger - installation package  
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- Indoor and outdoor tests of a liquid solar collector  
M-FS-23886 878-10207 03
- Thermal performance of a flat-plate liquid solar collector  
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- Corrosion inhibitors for solar heating and cooling systems  
M-FS-23892 878-10209 03
- Performance of black-nickel and black-chrome solar collectors  
M-FS-23888 878-10210 03
- Measuring metallic concentrations in glycol solutions  
M-FS-23894 878-10211 03
- Glass solar collector - materials assessment  
M-FS-23926 878-10212 03
- Pump efficiency in solar-energy systems  
M-FS-23934 878-10213 03
- The economics of solar powered absorption cooling  
M-FS-23908 878-10214 03
- Application of solar energy to air-conditioning  
M-FS-23913 878-10215 03
- Solar-powered hot-water system  
NPO-14270 878-10324 03
- Thin silicon-solar cell fabrication  
NPO-14047 878-10325 03
- Natural-oxide solar-collector coatings  
M-FS-23518 878-10326 03
- Problems encountered in solar heating and cooling systems  
M-FS-23974 878-10331 03
- Prototype solar-heating system design package  
M-FS-23945 878-10332 03
- Prototype residential solar-energy system-design package  
M-FS-23953 878-10333 03
- Prototype residential solar-energy system-installation package  
M-FS-23956 878-10334 03
- Evaluation of an air solar collector  
M-FS-23978 878-10336 03
- Indoor tests of a hot-air solar collector  
M-FS-23954 878-10337 03
- Performance evaluation of an air solar collector  
M-FS-23968 878-10338 03
- Solar simulator test facility  
M-FS-23972 878-10477 03
- More efficient GaAs solar cells  
LANGLEY-12216 878-10479 03
- Solar-powered hot-air system  
M-FS-23976 878-10481 03
- Solar-heating system design data brochure  
M-FS-23977 878-10492 03
- Solar-heating system performance tests  
M-FS-25021 878-10493 03
- Solar-heating system  
M-FS-25022 878-10494 03
- Solar hot-water system  
M-FS-25043 878-10495 03
- Residential solar-heating system-design package  
M-FS-25071 878-10496 03
- Development and testing of a hot-air solar collector  
M-FS-23997 878-10497 03
- Design and installation of a flat-plate solar collector  
M-FS-25010 878-10498 03
- Liquid solar collector-performance tests  
M-FS-25082 878-10499 03
- Concentrating solar collector-installation package  
M-FS-25068 878-10500 03
- Corrosion inhibitors for solar-heating and cooling  
M-FS-25023 878-10501 03
- Absorptive coating for aluminum solar panels  
M-FS-25033 878-10507 04
- SOLAR ENERGY ABSORBERS**
- Prototype air flat-plate solar collector  
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M-FS-23890 878-10208 03
- Performance of black-nickel and black-chrome solar collectors  
M-FS-23888 878-10210 03
- SOLAR ENERGY CONVERSION**
- High-temperature solar converter  
GSFC-12234 878-10032 03
- Solar-energy bibliography  
M-FS-23823 878-10037 03
- Solar photolysis of water  
NPO-14126 878-10049 04
- Prototype solar-heating system  
M-FS-23916 878-10180 03
- Residential solar-heating system  
M-FS-23909 878-10181 03
- Programmable controller for solar heating  
M-FS-23915 878-10183 03
- Automated solar-cell-array assembly machine  
NPO-13652 878-10186 03
- Prototype residential solar-energy system  
M-FS-23932 878-10191 03
- Prototype residential solar-energy system-engineering analysis  
M-FS-23929 878-10192 03
- Residential solar-heating system - design brochure  
M-FS-23933 878-10193 03
- Prototype solar-heating system-engineering analysis  
M-FS-23910 878-10194 03
- Prototype solar-heating system - installation manual  
M-FS-23907 878-10195 03

- Prototype residential solar-energy  
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- SOLAR FLUX DENSITY**  
Terrestrial photovoltaic measurements  
LEWIS-13057 878-10310 01
- SOLAR GENERATORS**  
Solar-energy bibliography  
M-FS-23823 878-10037 03  
Voltage regulator for solar panels  
NPO-13895 878-10478 03
- SOLAR HEATING**  
Solar-energy bibliography  
M-FS-23823 878-10037 03  
Prototype solar-heating system  
M-FS-23916 878-10180 03  
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M-FS-23909 878-10181 03  
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M-FS-23775 878-10182 03  
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M-FS-23915 878-10183 03  
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Prototype residential solar-energy  
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M-FS-23956 878-10334 03
- SOLAR INSTRUMENTS**  
Cosine-corrected optical diffuser  
NPO-14288 878-10322 03
- SOLAR RADIATION**  
Improved conical solar concentrator  
NPO-13825 878-10187 03
- SOLAR REFLECTORS**  
High-temperature solar converter  
GSFC-12234 878-10032 03  
Double-sided solar-cell package  
NPO-14199 878-10033 03  
Improved conical solar concentrator  
NPO-13825 878-10187 03  
Optics for natural lighting  
LANGLEY-12333 878-10189 03
- SOLAR SIMULATORS**  
Accelerated-weathering test-system for  
solar cells  
NPO-14061 878-10185 03  
Flat-plate liquid solar collector  
M-FS-23912 878-10205 03  
Solar simulator test facility  
M-FS-23972 878-10477 03
- SOLDERED JOINTS**  
Flicking-wire drag tensioner  
MSC-16367 878-10109 07
- SOLDERING**  
Two braze alloys for thin-wall  
components  
M-FS-19206 878-10117 08  
Bench-top soldering aid for PC boards  
MSC-16274 878-10121 08  
High-vacuum, low-temperature bond for  
second-surface mirrors  
M-FS-23405 878-10124 08  
'PC fabrication' for silicon solar-cell  
arrays  
NPO-13991 878-10131 08
- SOLENOID VALVES**  
Latching solenoid for cryogenic valves  
MSC-18106 878-10418 07
- SOLID PHASES**  
High-gradient continuous-casting  
furnace  
LEWIS-12934 878-10425 08
- SOLID ROCKET PROPELLANTS**  
Predicting structures of cross-linked  
condensation polymers  
NPO-14007 878-10352 04
- SOLID STATE DEVICES**  
CMOS-array design-automation  
techniques  
M-FS-23762 878-10311 01  
Zone-refining encapsulated  
semiconductors  
M-FS-23902 878-10351 04
- SOLIDIFICATION**  
Controlling the growth of silicon sheets  
NPO-14295 878-10581 08
- SOLUBILITY**  
Positively charged membrane for urea  
dialysis  
NPO-14101 878-10241 05
- SOLUTIONS**  
Electroplating and stripping copper on  
molybdenum and niobium  
LEWIS-12151 878-10055 04

**SOLVENT EXTRACTION**

- Coal mining with a liquid solvent  
NPO-14028 B78-10345 04
- SOLVENTS**  
Low-temperature elastomer production and curing  
NPO-13899 B78-10346 04
- SOUND FIELDS**  
Hybrid random-sound test-control system  
NPO-13900 B78-10025 02
- SOUND TRANSMISSION**  
Airframe design for reducing cabin noise  
LANGLEY-12097 B78-10257 06
- SOUND WAVES**  
Implantable digital hearing aid  
KSC-11009 B78-10373 05  
Predicting rotor rotation noise  
LANGLEY-12098 B78-10406 06
- SPACE FLIGHT FEEDING**  
Automatic primate feeder  
LANGLEY-11586 B78-10246 05
- SPACE SHUTTLE ORBITERS**  
Fuseholders allow fast system checkout  
MSC-16856 B78-10088 06
- SPACECRAFT ELECTRONIC EQUIPMENT**  
Portable spark-gap arc generator  
LEWIS-12886 B78-10008 01
- SPACECRAFT STABILITY**  
Improved notation controller  
GSFC-12273 B78-10383 06
- SPACECRAFT TRAJECTORIES**  
Solar-electric geocentric transfer  
LEWIS-12939 B78-10403 06
- SPARE PARTS**  
Spares-optimized model  
MSC-18015 B78-10446 09  
Computation of spare parts requirements  
MSC-16872 B78-10593 09
- SPARK GAPS**  
Portable spark-gap arc generator  
LEWIS-12886 B78-10008 01
- SPECIFICATIONS**  
Evaluation of an air solar collector  
M-FS-23978 B78-10336 03
- SPECIMENS**  
Mounting procedure for geological samples  
MSC-18206 B78-10327 03  
Retainer for laboratory animals  
LANGLEY-12353 B78-10371 05  
Safe, durable soil sampler  
MSC-18171 B78-10577 07
- SPECTRA**  
Oxygen and nitrogen raman spectra  
LEWIS-12849 B78-10361 04
- SPECTRAL BANDS**  
Processing multispectral signals from a discrete-sensor array  
NPO-14211 B78-10442 09
- SPECTRAL EMISSION**  
Custom blending of lamp phosphors  
MSC-16692 B78-10056 04
- SPECTRAL SIGNATURES**  
Hybrid random-sound test-control system  
NPO-13900 B78-10025 02  
Measuring metallic concentrations in glycol solutions  
M-FS-23894 B78-10211 03  
Predicting crop production from satellite data  
GSFC-12379 B78-10595 09

**SPECTROMETERS**

- Automatic gain-balancing circuit  
LANGLEY-12074 B78-10297 01
- Improved fourier interference spectrometer  
NPO-14025 B78-10485 03
- SPECTROPHOTOMETERS**  
Instrument measures many optical properties in visible and IR  
LANGLEY-12285 B78-10489 03
- SPECTRORADIOMETERS**  
Cosine-corrected optical diffuser  
NPO-14288 B78-10322 03
- SPECTROSCOPY**  
Pulsed NMR spectroscopy  
NPO-14023 B78-10175 03
- SPECTRUM ANALYSIS**  
Automatic radio-transmission monitor  
NPO-13941 B78-10165 02  
Wideband digital spectrum analyzer  
NPO-14394 B78-10468 02  
Improved fourier interference spectrometer  
NPO-14025 B78-10485 03
- SPEED CONTROL**  
Shaft speed control  
NPO-14170 B78-10416 07
- SPEED INDICATORS**  
'Pseudobackscatter' laser velocimeter  
ARC-10970 B78-10318 03  
Shock-swallowing air sensor  
FRC-10107 B78-10537 06  
Measuring projectile speed  
LANGLEY-12387 B78-10538 06  
Miniature velocimeter  
LANGLEY-12281 B78-10539 06
- SPIN RESONANCE**  
Pulsed NMR spectroscopy  
NPO-14023 B78-10175 03
- SPIN-LATTICE RELAXATION**  
Pulsed NMR spectroscopy  
NPO-14023 B78-10175 03
- SPINDLES**  
Improved transformer-winding method  
NPO-14243 B78-10282 08
- SPINE**  
A probe for blood-vessel and spinal interiors  
NPO-14132 B78-10242 05
- SPIRAL WRAPPING**  
Nylon screws make inexpensive coil forms  
MSC-16912 B78-10003 01
- SPlicing**  
Splicing shielded cables  
MSC-18297 B78-10453 01
- SPLINES**  
'Nonfloating' universal joint  
MSC-19546 B78-10108 07
- SPOILER SLOT AILERONS**  
Aircraft trailing vortex hazard alleviators  
LANGLEY-12034 B78-10272 07
- SPONGES (MATERIALS)**  
No-warp potted circuits  
MSC-19729 B78-10435 08
- SPONTANEOUS COMBUSTION**  
Directory of fire research specialists  
LEWIS-13123 B78-10399 06
- SPRAYED COATINGS**  
Simplified tooling for spray masking  
MSC-16927 B78-10136 08
- SPRAYERS**  
Extension handle for spray cans  
KSC-11083 B78-10576 07
- SPRAYING**  
Simplified tooling for spray masking  
MSC-16927 B78-10136 08

**SPRINGS (ELASTIC)**

- Spring control of wire harness loops  
MSC-18246 B78-10411 07
- SPUTTERING**  
Ion-beam texturing of materials  
LEWIS-12996 B78-10357 04  
Biomedical applications of ion-beam technology  
LEWIS-12807 B78-10363 05
- STABILIZATION**  
Improved notation controller  
GSFC-12273 B78-10383 06
- STABILIZERS (AGENTS)**  
Fast-drying coating  
MSC-16056 B78-10060 04
- STAINLESS STEELS**  
Form die and glide plates for vacuum brazing  
MSC-16549 B78-10113 08  
Internal grid for release of brazing retorts  
MSC-19472 B78-10114 08  
Vacuum control for brazing stainless steel  
MSC-19457 B78-10115 08  
Mechanical properties of 18-2 Mn stainless steel  
M-FS-23843 B78-10229 04  
Nitronic 60: a new alloy  
M-FS-23844 B78-10230 04  
Embrittlement proof nickel-alloy bellows  
M-FS-19331 B78-10349 04
- STANDARDIZATION**  
Standardized gas-temperature probes  
LEWIS-13059 B78-10392 06
- STANDARDS**  
Mass spectrometer calibration standard  
NPO-14097 B78-10249 06  
Calibration standards for PIND tests  
MSC-18169 B78-10388 06
- STARK EFFECT**  
Improved 'spectrophone'  
NPO-14143 B78-10167 03
- STATIC DISCHARGERS**  
Portable spark-gap arc generator  
LEWIS-12886 B78-10008 01
- STATIC ELECTRICITY**  
Antistatic additive for polyimide films  
NPO-14232 B78-10220 04  
Antistatic coating for acrylics  
NPO-13867 B78-10509 04
- STATIC PRESSURE**  
Orifice calibration module  
LANGLEY-12269 B78-10393 06  
Static-pressure probe for small geometries  
LANGLEY-11552 B78-10395 06
- STATISTICAL DECISION THEORY**  
Model for redundant-sensor signal errors  
MSC-16715 B78-10146 09
- STATISTICAL TESTS**  
Real-time instrument averages 100 data sets  
LEWIS-13093 B78-10534 06
- STEAM**  
Easily installed insulation for steamfittings  
MSC-18277 B78-10589 08
- STEELS**  
Processing high-strength steel alloys  
MSC-16172 B78-10441 08
- STEERABLE ANTENNAS**  
Control of small phased-array antennas  
MSC-14938 B78-10166 02



# STERILIZATION

- Self-sterilizing canister  
NPO-14237 B78-10064 05
- Corona-discharge air-purification system  
ARC-10975 B78-10350 04
- resterilizable electrode for  
electrosurgery  
HQN-10915 B78-10370 05

# STIMULATED EMISSION

- Vacuum-ultraviolet laser uses superfluid  
helium  
NPO-13993 B78-10323 03

# STIRLING CYCLE

- Stirling-engine design manual  
LEWIS-13098 B78-10580 07

# STOMACH

- Antihistamines reduce ulceration  
produced by indomethacin  
ARC-11118 B78-10366 05

# STOPPING

- Device for pitching off metal tubes  
GSFC-12274 B78-10410 07

# STORAGE BATTERIES

- Glass tubes for protecting solar cells  
NPO-14200 B78-10031 03

# STORAGE TANKS

- Solar hot-water system  
M-FS-25043 B78-10495 03

# STRAIN GAGES

- Improved strain-gage calibration  
MSC-16852 B78-10074 06
- Compact piston-position sensor  
LEWIS-12392 B78-10102 07
- Ultrathin films as photomechanical  
transducer  
NPO-14363 B78-10491 03

# STRANDS

- Ultrafine PBI fibers and yarns  
ARC-11221 B78-10504 04

# STRAPS

- Human arm may act as antenna  
ARC-11195 B78-10161 02
- Bend-absorbing clamp  
MSC-16971 B78-10575 07

# STRESS ANALYSIS

- Stress analysis under component relative  
interference fit  
LEWIS-12911 B78-10261 06
- Structural performance analysis and  
redesign  
LANGLEY-12213 B78-10264 06
- Resizing algorithm for loaded structures  
LANGLEY-12064 B78-10594 09

# STRESS CONCENTRATION

- Gear-tooth fatigue-strength estimates  
MSC-18167 B78-10573 07

# STRESS CORROSION

- Mechanical properties of 18-2 Mn  
stainless steel  
M-FS-23843 B78-10229 04
- Nitronic 60: a new alloy  
M-FS-23844 B78-10230 04

# STRESSES

- Stress analysis under component relative  
interference fit  
LEWIS-12911 B78-10261 06

# STRIP TRANSMISSION LINES

- Microstrip backfire antenna  
LANGLEY-12172 B78-10019 02

# STRUCTURAL ANALYSIS

- Stress analysis under component relative  
interference fit  
LEWIS-12911 B78-10261 06
- Structural performance analysis and  
redesign  
LANGLEY-12213 B78-10264 06

- Analysis of linear viscoelastic structures  
NPO-13197 B78-10266 06
- Calculation of planar-truss modal  
frequencies  
LANGLEY-12137 B78-10382 06
- Nacelle incremental drag  
LEWIS-12786 B78-10400 06
- Plotting max/min data envelopes  
MSC-18016 B78-10597 09

# STRUCTURAL DESIGN

- Structural performance analysis and  
redesign  
LANGLEY-12213 B78-10264 06
- Calculation of planar-truss modal  
frequencies  
LANGLEY-12137 B78-10382 06
- Lattice panels with high structural  
efficiency  
LANGLEY-11898 B78-10426 08
- Low-cost graphite/epoxy structural  
panels  
M-FS-23871 B78-10427 08
- Lightweight conical antenna reflector  
NPO-13552 B78-10472 02
- Resizing algorithm for loaded structures  
LANGLEY-12064 B78-10594 09

# STRUCTURAL DESIGN CRITERIA

- Design of transmission shafting  
LEWIS-12965 B78-10107 07

# STRUCTURAL FAILURE

- Design of transmission shafting  
LEWIS-12965 B78-10107 07

# STRUCTURAL MEMBERS

- Analysis of cracked orthotropic sheets  
LANGLEY-12288 B78-10405 06
- Lattice panels with high structural  
efficiency  
LANGLEY-11898 B78-10426 08
- Reducing weld peaking in aluminum  
M-FS-23973 B78-10433 08

# SUBMINIATURIZATION

- Subminiature hydraulic actuator  
LANGLEY-11522 B78-10269 07

# SUBSONIC FLOW

- Flow velocities and streamlines  
LEWIS-12966 B78-10094 06
- Flow in axisymmetric ducts with struts  
LEWIS-12798 B78-10556 06

# SUBSTITUTES

- Spares-optimized model  
MSC-18015 B78-10446 09

# SUBSTRATES

- Forming 'dynamic' membranes on  
stainless steel  
MSC-18172 B78-10513 04

# SUNLIGHT

- Inexpensive, portable, integrating solar  
energy meter  
LEWIS-12804 B78-10188 03
- Optics for natural lighting  
LANGLEY-12333 B78-10189 03
- Solar simulator test facility  
M-FS-23972 B78-10477 03

# SUPERFLUIDITY

- Vacuum-ultraviolet laser uses superfluid  
helium  
NPO-13993 B78-10323 03

# SUPERHIGH FREQUENCIES

- Real-time monitoring of crustal  
deformations  
NPO-14124 B78-10034 03

# SUPERSONIC COMBUSTION RAMJET ENGINES

- Convectively cooled structures  
LANGLEY-12347 B78-10404 06

# SUPERSONIC DRAG

- Nacelle incremental drag  
LEWIS-12786 B78-10400 06

# SUPERNONICS

- Shock-swallowing air sensor  
FRC-10107 B78-10537 06

# SUPPORTS

- Vibration-free thermal link  
GSFC-12297 B78-10169 03
- Gentle support stands for fluid-line  
mockups  
MSC-16479 B78-10291 08
- Rigid 'Sling' for topheavy loads  
GSFC-12359 B78-10574 07

# SURFACE DISTORTION

- Detecting surface deformations  
photographically  
MSC-16156 B78-10547 06

# SURFACE ENERGY

- Biocompatibility of surgical implants  
NPO-14291 B78-10368 05

# SURFACE FINISHING

- Boron trifluoride coatings for plastics  
ARC-11057 B78-10043 04
- Surface examination of small particles  
LEWIS-12842 B78-10075 06
- Ion-beam, texturing of materials  
LEWIS-12996 B78-10357 04
- Biomedical applications of ion-beam  
technology  
LEWIS-12807 B78-10363 05
- Holding fixture for variable-contour  
parts  
MSC-16270 B78-10429 08
- Process for growing thin polished silicon  
sheets  
NPO-14172 B78-10434 08
- Breather cloth for vacuum curing  
MSC-18063 B78-10440 08
- Coating for hot sliding seals  
MSC-16529 B78-10562 07
- Electroplated 'cold patch' for critical  
parts  
M-FS-19401 B78-10584 08

# SURFACE LAYERS

- Applying uniform adhesive coatings  
MSC-19462 B78-10583 08

# SURFACE PROPERTIES

- Ultra-high-strength boron fibers  
LEWIS-12739 B78-10051 04

# SURFACE TEMPERATURE

- Predicting surface heat flux  
MSC-16095 B78-10090 06
- Orbital heat rate package  
M-FS-23980 B78-10554 06

# SURGERY

- Biocompatibility of surgical implants  
NPO-14291 B78-10368 05
- Intraocular pressure reduction and  
regulation  
LEWIS-12723 B78-10523 05

# SURGICAL INSTRUMENTS

- resterilizable electrode for  
electrosurgery  
HQN-10915 B78-10370 05
- Flow-compensating pressure regulator  
LEWIS-12718 B78-10522 05

# SURVEILLANCE RADAR

- Air-traffic surveillance systems  
NPO-14173 B78-10313 02

# SWAGING

- Riveting-force gage  
NPO-13477 B78-10432 08

# SWEAT

- Sweat collection capsule  
ARC-11031 B78-10367 05

**SWITCHES**

- High-power RF switch  
NPO-14229 878-10151 01  
Easily-wired toggle switch  
MSC-18102 878-10301 01

**SWITCHING**

- Automatic circuit interrupter  
MSC-16697 878-10300 01

**SWITCHING CIRCUITS**

- Symmetric voltage-controlled variable resistance  
MSC-16685 878-10148 01  
IC implementation of crossbar switches  
NPO-13837 878-10153 01  
High-Speed, high-power, switching transistor  
LEWIS-13021 878-10298 01  
Improved driver for capacitive loads  
LANGLEY-11609 878-10304 01  
Power-switch dV/dt sensing  
MSC-16707 878-10307 01  
Phase-shift array, arbitrary and continuous through 360 deg  
LANGLEY-12272 878-10308 01  
One-third selection for matrix-addressing ferroelectrics  
LANGLEY-11993 878-10456 01  
Dynamic braking of bidirectional motors  
ARC-11194 878-10578 07

**SWITCHING THEORY**

- Representation of multivalued logic functions  
NPO-13760 878-10596 09

**SWIVELS**

- Rigid coupling is also flexible  
MSC-16488 878-10098 07

**SYMMETRY**

- Compact antenna has symmetrical radiation pattern  
ARC-11189 878-10473 02

**SYNCHRONISM**

- Synchronous transfer circuits for redundant systems  
NPO-14162 878-10157 01  
Chopper-stabilized phase detector  
MSC-16461 878-10163 02  
Simplified phase detector  
NPO-13395 878-10457 01

**SYNCHRONIZED OSCILLATORS**

- Digital phase shifter synchronizes local oscillators  
MSC-16695 878-10011 01  
Synchronous transfer circuits for redundant systems  
NPO-14162 878-10157 01

**SYNTHESIZERS**

- Voice-output solar energy reporter  
LEWIS-12947 878-10022 02

**SYNTHETIC FIBERS**

- Ultrafine PBI fibers and yarns  
ARC-11221 878-10504 04

**SYNTHETIC FUELS**

- Hydrogen enrichment of synthetic fuel  
M-FS-23279 878-10039 04

**SYSTEM FAILURES**

- Preventing radio-paging system tieup  
MSC-19696 878-10024 02  
Synchronous transfer circuits for redundant systems  
NPO-14162 878-10157 01  
Detecting servo failures with software  
FRC-11003 878-10396 06

**SYSTEMS ANALYSIS**

- Hydraulic dynamic analysis  
MSC-16795 878-10095 06

- Marshall system for aerospace simulation  
M-FS-22672 878-10296 09  
Multipurpose system simulator  
GSFC-12333 878-10444 09

**T****TAIL ASSEMBLIES**

- Spring control of wire harness loops  
MSC-18246 878-10411 07

**TANKS (CONTAINERS)**

- Damage-detection system for LNG carriers  
LANGLEY-11463 878-10250 06

**TANTALUM**

- Ion-beam texturing of materials  
LEWIS-12996 878-10357 04

**TAPE RECORDERS**

- Portable data system  
ARC-11136 878-10316 02

**TEFLON (TRADEMARK)**

- Selection standard for FEP films for solar energy  
MSC-16999 878-10190 03  
High-pressure cryogenic cylinder seal  
M-FS-19335 878-10421 07

**TELECOMMUNICATION**

- Adaptive polarization separation experiments  
LANGLEY-12196 878-10006 01  
Simplified data compressor  
NPO-14041 878-10023 02  
Lightweight conical antenna reflector  
NPO-13552 878-10472 02  
Telecommunications network optimization  
NPO-14486 878-10476 02

**TELEMETRY**

- Wideband EMG telemetry system  
ARC-11209 878-10375 05  
Measuring radio-signal power accurately  
NPO-13373 878-10464 02

**TELEPHONY**

- Voice-output solar energy reporter  
LEWIS-12947 878-10022 02

**TELEPRINTERS**

- Portable data system  
ARC-11136 878-10316 02

**TELEVISION CAMERAS**

- Infrared-enhanced TV for fire detection  
M-FS-19380 878-10172 03  
Processing multispectral signals from a discrete-sensor array  
NPO-14211 878-10442 09

**TELEVISION EQUIPMENT**

- Video scrambler/descrambler  
MSC-16843 878-10013 02

**TELEVISION SYSTEMS**

- Simulator for training remote-manipulator operators  
MSC-14921 878-10415 07

**TELEVISION TRANSMISSION**

- Video scrambler/descrambler  
MSC-16843 878-10013 02

**TEMPERATURE**

- Low-chromium stainless steels  
LEWIS-12543 878-10046 04  
High-temperature ca facitive pressure transducer  
LEWIS-13078 878-10398 06

**TEMPERATURE CONTROL**

- Controlled freezing of biological samples  
GSFC-12173 878-10065 05  
Thermal-control canister  
GSFC-12253 878-10079 06  
Thermal compensator for helium refrigerators  
GSFC-12168 878-10082 06  
Temperature stabilization of microwave ferrite devices  
MSC-16833 878-10152 01  
Prototype solar-heating system  
M-FS-23916 878-10180 03  
Residential solar-heating system  
M-FS-23909 878-10181 03  
Multichannel temperature control for solar heating  
M-FS-23775 878-10182 03  
Prototype residential solar-energy system  
M-FS-23932 878-10191 03  
Prototype residential solar-energy system-engineering analysis  
M-FS-23929 878-10192 03  
Residential solar-heating system - design brochure  
M-FS-23933 878-10193 03  
Solar-heating module  
M-FS-23925 878-10196 03  
Solar-powered hot-water system  
NPO-14270 878-10324 03  
Modular heat-pipe-radiator panel  
MSC-16625 878-10328 03  
Prototype solar-heating system design package  
M-FS-23945 878-10332 03  
Prototype residential solar-energy system-design package  
M-FS-23953 878-10333 03  
Prototype residential solar-energy system-installation package  
M-FS-23956 878-10334 03  
Automated controller for liquid-cooled garments  
MSC-18055 878-10365 05  
Temperature-gradient oven  
M-FS-23919 878-10390 06  
Automated temperature-cycling apparatus  
LANGLEY-12310 878-10391 06  
Infrared scanners detect thermal gradients in building walls  
LANGLEY-12157 878-10480 03  
Solar-powered hot-air system  
M-FS-23976 878-10481 03  
Thermoelectrically-cooled erature probe  
MSC-18192 878-10484 03  
Solar-heating system design data brochure  
M-FS-23977 878-10492 03  
Solar-heating system performance tests  
M-FS-25021 878-10493 03  
Solar-heating system  
M-FS-25022 878-10494 03  
Residential solar-heating system-design package  
M-FS-25071 878-10496 03  
Development and testing of a hot-air solar collector  
M-FS-23997 878-10497 03  
Design and installation of a flat-plate solar collector  
M-FS-25010 878-10498 03  
Liquid solar collector-performance tests  
M-FS-25082 878-10499 03

Coated-felt thermal insulation  
MSC-12737 878-10510 04

Metallic thermal seal  
MSC-18135 878-10566 07

Localized cooling of electronic components  
LANGLEY-11955 878-10569 07

**TEMPERATURE DISTRIBUTION**  
Wide-temperature corrosion-resistant pressure regulator  
NPO-13776 878-10274 07

Orbital heat rate package  
M-FS-23980 878-10554 06

**TEMPERATURE EFFECTS**  
Testing composite sheets at high temperatures  
MSC-16237 878-10252 06

Effects of moisture on graphite/epoxy composites  
MSC-18045 878-10360 04

Automated temperature-cycling apparatus  
LANGLEY-12310 878-10391 06

**TEMPERATURE GRADIENTS**  
Practical and efficient magnetic heat pump  
LEWIS-12508 878-10170 03

Temperature-gradient oven  
M-FS-23919 878-10390 06

High-gradient continuous-casting furnace  
LEWIS-12934 878-10425 08

Ocean thermal plant  
KSC-11034 878-10482 03

**TEMPERATURE MEASUREMENT**  
Body/bone-marrow differential-temperature sensor  
NPO-14121 878-10066 05

Thermocouples measure very-hot gas temperatures  
LEWIS-12843 878-10076 06

Infrared scanners for temperature measurement in wind tunnels  
LANGLEY-12171 878-10077 06

Calibration target for temperature radiometer  
LANGLEY-12239 878-10083 06

Oxygen and nitrogen raman spectra  
LEWIS-12849 878-10361 04

Hybrid temperature-monitoring circuit  
MSC-18231 878-10525 05

**TEMPERATURE MEASURING INSTRUMENTS**  
Standardized gas-temperature probes  
LEWIS-13059 878-10392 06

Miniature thermocouple disconnect  
LANGLEY-12013 878-10535 06

**TEMPERATURE PROBES**  
Body/bone-marrow differential-temperature sensor  
NPO-14121 878-10066 05

**TEMPERATURE SENSORS**  
Body/bone-marrow differential-temperature sensor  
NPO-14121 878-10066 05

**TEMPLATES**  
Circuit-lead trimming template  
MSC-16589 878-10439 08

**TENSILE PROPERTIES**  
Quick-and-easy shear-load testing  
MSC-16765 878-10073 06

Mechanical properties of 18-2 Mn stainless steel  
M-FS-23843 878-10229 04

Nitronic 60: a new alloy  
M-FS-23844 878-10230 04

Hydrogen embrittlement of nickel  
ARC-10966 878-10231 04

**TENSILE STRENGTH**  
Wrought nickel-base superalloy  
LEWIS-12844 878-10045 04

Low-chromium stainless steels  
LEWIS-12543 878-10046 04

Partial interlaminar separation for composites  
LANGLEY-12065 878-10052 04

Quick-and-easy shear-load testing  
MSC-16765 878-10073 06

**TENSILE TESTS**  
'Gentle' holder for brittle ceramics  
MSC-19645 878-10552 06

**TENSION**  
Improved strain-gage calibration  
MSC-16852 878-10074 06

**TERRESTRIAL RADIATION**  
Terrestrial photovoltaic measurements  
LEWIS-13057 878-10310 01

Estimating regional heat flux from scanning radiometer data  
LANGLEY-12158 878-10329 03

**TEST CHAMBERS**  
Automated temperature-cycling apparatus  
LANGLEY-12310 878-10391 06

Compression testing of flammable liquids  
MSC-16121 878-10548 06

Low partial discharge vacuum feedthrough  
GSFC-12347 878-10559 07

**TEST EQUIPMENT**  
Measuring oxide trapping parameters in MOS structure  
NPO-14120 878-10002 01

Quick-and-easy shear-load testing  
MSC-16765 878-10073 06

Calibration standards for PIND tests  
MSC-18169 878-10388 06

**TEST FACILITIES**  
Strobe-margin test for plated memory systems  
M-FS-23838 878-10154 01

Universal test fixture for solar cells  
NPO-14062 878-10184 03

Accelerated-weathering test-system for solar cells  
NPO-14061 878-10185 03

Testing of three hot-air solar collectors  
M-FS-23887 878-10201 03

Flat-plate liquid solar collector  
M-FS-23912 878-10205 03

Testing composite sheets at high temperatures  
MSC-16237 878-10252 06

Photovoltaic systems test facility  
LEWIS-13073 878-10378 06

Testing integrated circuits by photoexcitation  
M-FS-23943 878-10451 01

Solar simulator test facility  
M-FS-23972 878-10477 03

**TEST STANDS**  
Testing composite sheets at high temperatures  
MSC-16237 878-10252 06

**TEST VEHICLES**  
Test-vehicle cycle programmer  
LEWIS-12977 878-10020 02

**TETHERLINES**  
Modified pipe extension safely releases chain binders  
MSC-16937 878-10103 07

**TEXTURES**  
Biomedical applications of ion-beam technology  
LEWIS-12807 878-10363 05

Ion-beam-textured graphite  
LEWIS-12724 878-10506 04

**THERMAL CONDUCTIVITY**  
Predicting surface heat flux  
MSC-16095 878-10090 06

Vibration-free thermal link  
GSFC-12297 878-10169 03

**THERMAL CONTROL COATINGS**  
Electrically-conducting thermal-control coating  
GSFC-12207 878-10044 04

Selection standard for FEP films for solar energy  
MSC-16999 878-10190 03

Breather cloth for vacuum curing  
MSC-18063 878-10440 08

**THERMAL CYCLING TESTS**  
Temperature-gradient oven  
M-FS-23919 878-10390 06

Automated temperature-cycling apparatus  
LANGLEY-12310 878-10391 06

No-warp potted circuits  
MSC-19729 878-10435 08

**THERMAL DEGRADATION**  
Brazed boron-silicon carbide/aluminum structural panels  
LANGLEY-12244 878-10221 04

**THERMAL ENVIRONMENTS**  
Thermal-control canister  
GSFC-12253 878-10079 06

Orbital heat rate package  
M-FS-23980 878-10554 06

**THERMAL INSULATION**  
Improved thermal-tile barrier  
MSC-16929 878-10133 08

Special weave for insulating fabrics  
MSC-16380 878-10288 08

Installing fiber insulation in tight spaces  
MSC-16934 878-10289 08

Infrared scanners detect thermal gradients in building walls  
LANGLEY-12157 878-10480 03

Coated-felt thermal insulation  
MSC-12737 878-10510 04

Metallic thermal seal  
MSC-18135 878-10566 07

Fastener for thermal insulation blankets  
MSC-18253 878-10571 07

Contouring pile-brush seals  
MSC-16231 878-10588 08

Easily installed insulation for steamfittings  
MSC-18277 878-10589 08

**THERMAL MAPPING**  
Energy conservation, using remote thermal scanning  
LEWIS-12812 878-10178 03

**THERMAL PROTECTION**  
Electrically-conducting thermal-control coating  
GSFC-12207 878-10044 04

**THERMAL RESISTANCE**  
Flame-retardant adhesive tape  
MSC-16721 878-10041 04

New adhesive withstands temperature extremes  
GSFC-12345 878-10042 04

Coating for hot sliding seals  
MSC-16529 878-10562 07

**THERMAL SHOCK**

Vacuum leadthrough for hydrogen maser  
NPO-14148 878-10422 07

**THERMAL STABILITY**

Thermal-control canister  
GSFC-12253 878-10079 06

**THERMAL STRESSES**

Resizing algorithm for loaded structures  
LANGLEY-12064 878-10594 09

**THERMOCOUPLES**

Controlled freezing of biological samples  
GSFC-12173 878-10065 05  
Thermocouples measure very-hot gas temperatures  
LEWIS-12843 878-10076 06  
Calibration target for temperature radiometer  
LANGLEY-12239 878-10083 06  
Predicting surface heat flux  
MSC-16095 878-10090 06  
Internal grid for release of brazing retorts  
MSC-19472 878-10114 08  
Standardized gas-temperature probes  
LEWIS-13059 878-10392 06  
Miniature thermocouple disconnect  
LANGLEY-12013 878-10535 06

**THERMODYNAMIC EFFICIENCY**

Thermal performance of shaft bearing system  
LEWIS-12761 878-10263 06

**THERMODYNAMIC PROPERTIES**

Thermal hydraulic analyzer  
MSC-18014 878-10265 06  
Graphics program for charts  
LEWIS-12811 878-10598 09

**THERMOELECTRIC COOLING**

Thermoelectrically-cooled variable-temperature probe  
MSC-18192 878-10484 03

**THERMOELECTRIC GENERATORS**

Ocean thermal plant  
KSC-11034 878-10482 03

**THERMOPILES**

Voice-output solar energy reporter  
LEWIS-12947 878-10022 02

**THERMOSETTING RESINS**

Cure-rate data for silicone adhesive  
GSFC-12330 878-10057 04  
Response of graphite/epoxy composites to moisture  
MSC-16899 878-10228 04

**THERMOSTATS**

Multichannel temperature control for solar heating  
M-FS-23775 878-10182 03

**THICKNESS**

Calculating wire-bundle diameter  
MSC-16378 878-10119 08  
Improved nucleonic coal-thickness monitor  
M-FS-23725 878-10344 04  
Measurement of subcoat thickness by characteristic x-rays  
MSC-16718 878-10505 04

**THIN FILMS**

Mossbauer studies of bulk and thin-film FeTe  
M-FS-23773 878-10059 04  
Control of dielectric film deposition  
LEWIS-13092 878-10430 08  
Preparing thin aluminum films for adhesive bonding  
NPO-14357 878-10591 08

**THIN PLATES**

Process for growing thin polished silicon sheets  
NPO-14172 878-10434 08

Controlling the growth of silicon sheets  
NPO-14295 878-10581 08

**THIN WALLED SHELLS**

Wrench for thin-walled cylinders  
LANGLEY-12286 878-10579 07

**THREADS**

Nylon screws make inexpensive coil forms  
MSC-16912 878-10003 01  
Antibackoff lock for nuts and bolts  
MSC-16472 878-10409 07  
Quick-connect threaded attachment joint  
LANGLEY-12232 878-10414 07

**THRUST BEARINGS**

Dynamics of gas-thrust bearings  
LEWIS-12754 878-10097 06  
Improved gas thrust bearings  
LEWIS-12569 878-10413 07

**THUNDERSTORMS**

System for monitoring lightning strikes  
KSC-11018 878-10475 02

**THYRISTORS**

Gate-assisted turn-off thyristor  
LEWIS-12535 878-10004 01  
High-Speed, high-power, switching transistor  
LEWIS-13021 878-10298 01

**TIDE POWERED GENERATORS**

Wind/water energy converter  
GSFC-12361 878-10483 03

**TILES**

Improved thermal-tile barrier  
MSC-16929 878-10133 08  
Tile-bonding tool  
KSC-11053 878-10134 08  
High-temperature waterproofing for tiles  
MSC-16773 878-10135 08

**TIME LAG**

Preventing radio-paging system tieup  
MSC-19696 878-10024 02

**TIME MEASUREMENT**

Measuring projectile speed  
LANGLEY-12387 878-10538 06

**TIMING DEVICES**

Simple digital pulse-programming circuit  
NPO-13747 878-10299 01  
Hybrid clock generator  
MSC-18228 878-10530 05

**TIN ALLOYS**

High-gradient continuous-casting furnace  
LEWIS-12934 878-10425 08

**TISSUES (BIOLOGY)**

Controlled freezing of biological samples  
GSFC-12173 878-10065 05

**TOOLING**

Simplified tooling for spray masking  
MSC-16927 878-10136 08

**TOOLS**

Simple tool removes IC flat packs  
MSC-16058 878-10010 01  
Tool simplifies weld preparation of aluminum  
MSC-16992 878-10123 08  
Improved thermal-tile barrier  
MSC-16929 878-10133 08  
Compact ratchet wrench  
M-FS-24252 878-10273 07  
Adhesive-removal tool  
MSC-19498 878-10279 07

Safe, durable soil sampler

MSC-18171 878-10577 07  
Wrench for thin-walled cylinders  
LANGLEY-12286 878-10579 07

**TOPOGRAPHY**

Ocean-wave ray or crest diagrams in shoaling waters  
LANGLEY-12380 878-10341 03

**TORQUE**

Design of transmission shafting  
LEWIS-12965 878-10107 07  
Transmitting rotary motion at an angle  
MSC-19483 878-10561 07

**TORQUEMETERS**

Combination force and angular-deflection indicator  
MSC-16155 878-10070 06  
Ultrasonic extensometer measures bolt preload  
M-FS-19337 878-10271 07

**TORSIONAL STRESS**

Noncontact measurement of angular deflection  
LANGLEY-12178 878-10071 06

**TOUGHNESS**

Partial interlaminar separation for composites  
LANGLEY-12065 878-10052 04

**TOWED BODIES**

Scale parachute fabrication  
M-FS-23139 878-10141 08

**TOXIC HAZARDS**

Cryostat safety tent  
GSFC-12206 878-10080 06

**TOXICITY**

Toxic substances handbook  
LEWIS-13124 878-10359 04  
Directory of fire research specialists  
LEWIS-13123 878-10399 06

**TRACE CONTAMINANTS**

High-temperature brazing of stainless steel  
MSC-19459 878-10112 08  
Multiple-sample holder for IC testing  
NPO-14314 878-10540 06

**TRACE ELEMENTS**

Improved epoxy adhesive with radiographic tracer  
MSC-18020 878-10225 04

**TRACKING (POSITION)**

Air-traffic surveillance systems  
NPO-14173 878-10313 02

**TRACKING FILTERS**

Chopper-stabilized phase detector  
MSC-16461 878-10163 02

**TRACKING RADAR**

Air-traffic surveillance systems  
NPO-14173 878-10313 02

**TRACTORS**

Aerodynamic design lowers truck fuel consumption  
FRC-11015 878-10069 06

**TRAFFIC CONTROL**

Optical traffic-sensing concept  
NPO-13603 878-10021 02

**TRAILERS**

Aerodynamic design lowers truck fuel consumption  
FRC-11015 878-10069 06

**TRAINING DEVICES**

Simulator for training remote-manipulator operators  
MSC-14921 878-10415 07

**TRAINING SIMULATORS**

Custom blending of lamp phosphors  
MSC-16692 878-10056 04

**TRAJECTORY ANALYSIS**

Solar-electric geocentric transfer  
LEWIS-12939 B78-10403 06

**TRANSDUCERS**

Improved myocardium transducer  
NPO-14107 B78-10372 05

Photovoltaic systems test facility  
LEWIS-13073 B78-10378 06

High-temperature microphone system  
LANGLEY-12375 B78-10384 06

A solid-state phase-insensitive ultrasonic transducer  
LANGLEY-12304 B78-10385 06

Electronically-scanned pressure measurement system  
LANGLEY-12386 B78-10394 06

High-temperature capacitive pressure transducer  
LEWIS-13078 B78-10398 06

Noncontacting valve-position indicator  
MSC-16048 B78-10412 07

Ultrathin films as photomechanical transducer  
NPO-14363 B78-10491 03

High-sampling-rate pressure transducer has in situ calibration  
LANGLEY-12230 B78-10536 06

**TRANSFORMERS**

Improved transformer-winding method  
NPO-14243 B78-10282 08

Bonding core mating surfaces improves transformer  
NPO-13855 B78-10283 08

**TRANSIENT LOADS**

Performance optimizing  
LANGLEY-11930 B78-10096 06

**TRANSISTOR CIRCUITS**

Bench-top soldering aid for PC boards  
MSC-16274 B78-10121 08

Symmetric voltage-controlled variable resistance  
MSC-16685 B78-10148 01

**TRANSISTORS**

High-Speed, high-power, switching transistor  
LEWIS-13021 B78-10298 01

All-ion-implantation process for integrated circuits  
M-FS-23995 B78-10590 08

**TRANSMISSION**

Coaxial isolator has versatile interface  
MSC-16908 B78-10009 01

**TRANSMISSION EFFICIENCY**

Selection standard for FEP films for solar energy  
MSC-16999 B78-10190 03

**TRANSMISSION LINES**

Power-switch dV/dt sensing  
MSC-16707 B78-10307 01

Splicing shielded cables  
MSC-18297 B78-10453 01

**TRANSMITTANCE**

Selection standard for FEP films for solar energy  
MSC-16999 B78-10190 03

**TRANSMITTERS**

Wideband EMG telemetry system  
ARC-11209 B78-10375 05

Determining the response of an FM receiver  
MSC-16751 B78-10465 02

**TRANSONIC FLOW**

Flow velocities and streamlines  
LEWIS-12966 B78-10094 06

**TRANSPARENCE**

Abrasion-resistant antireflective coating for polycarbonate  
ARC-11047 B78-10054 04

Fire-retardant epoxy polymers  
ARC-11182 B78-10218 04

Scratch resistant plastic lenses  
ARC-11039 B78-10519 04

**TRANSPORT PROPERTIES**

Graphics program for charts  
LEWIS-12811 B78-10598 09

**TRANSPORTATION**

Portable data system  
ARC-11136 B78-10316 02

**TRAPPING**

Measuring oxide trapping parameters in MOS structure  
NPO-14120 B78-10002 01

**TRIETHYL COMPOUNDS**

Chemical agent boosts natural-rubber output  
NPO-14185 B78-10358 04

**TRUCKS**

Aerodynamic design lowers truck fuel consumption  
FRC-11015 B78-10069 06

Modified pipe extension safely releases chain binders  
MSC-16937 B78-10103 07

**TRUSSES**

Calculation of planar-truss modal frequencies  
LANGLEY-12137 B78-10382 06

Rigid 'Sling' for topheavy loads  
GSFC-12359 B78-10574 07

**TUMBLING MOTION**

Tumbling-vehicle entry heating  
M-FS-23712 B78-10555 06

**TUNERS**

Low-power tuner for lasers  
M-FS-23863 B78-10486 03

**TUNGSTEN**

Vacuum leadthrough for hydrogen maser  
NPO-14148 B78-10422 07

**TURBIDITY**

Compact turbidity meter  
KSC-11063 B78-10545 06

**TURBINE BLADES**

Edge geometry of turbomachine blades  
LEWIS-12979 B78-10262 06

**TURBINE ENGINES**

Oxygen and nitrogen raman spectra  
LEWIS-12849 B78-10361 04

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Internal grid for release of brazing retorts  
MSC-19472 878-10114 08  
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MSC-19457 878-10115 08  
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MSC-16969 878-10116 08
- BIERMAN, G.**  
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NPO-14263 878-10447 09
- BILL, R. C.**  
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LEWIS-12623 878-10347 04
- BILLINGSLEY, F. C.**  
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NPO-13903 878-10018 02
- BILOW, N.**  
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ARC-11182 878-10218 04
- BIRCHENOUGH, A. G.**  
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LEWIS-12909 878-10149 01  
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LEWIS-13093 878-10534 06
- BLACK, J. M.**  
Efficient dc-to-dc converter  
FRC-11014 878-10012 01
- BLENNAN, C., JR.**  
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M-FS-23983 878-10516 04
- BOGHAMI, K. M.**  
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LANGLEY-12303 878-10259 06
- BOLTON, P. N.**  
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KSC-11064 878-10397 06
- BOWMAN, R. L.**  
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LEWIS-12812 878-10178 03
- BRACHER, F. H.**  
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NPO-13469 878-10600 09
- BRANDHORST, H. W., JR.**  
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LEWIS-13057 878-10310 01
- BRANDON, C. A.**  
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MSC-18172 878-10513 04
- BRASWELL, T. V.**  
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LANGLEY-11778 878-10565 07
- BRENNAN, A.**  
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M-FS-19206 878-10117 08
- BRESHEARS, R. R.**  
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NPO-13828 878-10100 07
- BREWE, D. E.**  
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- BRILES, O. M.**  
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MSC-16121 878-10548 06
- BRINKLEY, W.**  
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MSC-18167 878-10573 07
- BRODER, J. D.**  
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LEWIS-12729 878-10438 08
- BROOKS, D. E.**  
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M-FS-23883 878-10521 05
- BROOKS, R. R.**  
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MSC-16778 878-10233 05  
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MSC-16841 878-10235 05
- BROOKS, T. G.**  
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LANGLEY-12244 878-10221 04
- BROWN, G. V.**  
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LEWIS-12508 878-10170 03
- BROWN, J. J.**  
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MSC-19486 878-10560 07
- BROWN, P. A.**  
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ARC-11118 878-10366 05
- BROWN, W. C.**  
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NPO-13884 878-10471 02
- BROWN, W. T.**  
More efficient microwave-power transmission  
NPO-13885 878-10466 02
- BROYLES, H. F.**  
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NPO-14073 878-10062 05
- BRYANT, E. L.**  
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LANGLEY-12178 878-10071 06
- BRYANT, N. A.**  
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NPO-13903 878-10018 02
- BUCHANAN, E. C.**  
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M-FS-19358 878-10150 01
- BUDERER, M. C.**  
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MSC-18235 878-10369 05
- BURCH, J. L.**  
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M-FS-23225 878-10239 05  
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M-FS-23235 878-10270 07
- BURR, M. E.**  
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M-FS-19335 878-10421 07
- BURUM, D. P.**  
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NPO-14023 878-10175 03
- BUZEK, B. C.**  
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**BYRNE, E. J.**  
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MSC-18214 878-10551 06

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MSC-16929 878-10133 08

**CAIN, A. W.**  
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MSC-18015 878-10446 09

**CAMPBELL, R. G.**  
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MSC-18020 878-10225 04

**CAMPBELL, T. G.**  
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LANGLEY-12172 878-10019 02

**CANALI, V. G.**  
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GSFC-12241 878-10028 03

**CAPTAIN, K. M.**  
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LANGLEY-12303 878-10259 06

**CARNAHAN, D.**  
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LEWIS-13021 878-10298 01

**CARNEVALLE, A.**  
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MSC-19486 878-10560 07

**CARO, E. R.**  
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NPO-14229 878-10151 01

**CARUSO, S. V.**  
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M-FS-23829 878-10389 06

**CASABIANCA, C. C.**  
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NPO-14235 878-10104 07

**CASAD, T. A.**  
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NPO-13895 878-10478 03

**CASH, M.**  
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M-FS-23974 878-10331 03

**CASTLEMAN, K. R.**  
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**CAUDLE, J. M.**  
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M-FS-23997 878-10497 03

**CERVENKA, P.**  
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GSFC-12334 878-10490 03

**CHAN, C.**  
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**CHAPPELLE, E.**  
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GSFC-12158 878-10232 05  
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**CHIOU, J.**  
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**CHRISTENSEN, D. L.**  
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**CHU, C.**  
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**CHUNG, S. Y.**  
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**CISZEK, T. F.**  
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NPO-14295 878-10581 08

**CLARK, B.**  
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LANGLEY-11930 878-10096 06

**CLARKE, J. W.**  
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**CLATTERBUCK, C.**  
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GSFC-12330 878-10057 04

**CLAUSS, R. C.**  
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NPO-14252 878-10379 06

**CLEMONS, J. M.**  
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M-FS-23878 878-10387 06

**COCKRUM, R. H.**  
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NPO-14088 878-10001 01

**COHEN, N. V.**  
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LANGLEY-12172 878-10019 02

**COLE, J. D.**  
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MSC-18253 878-10571 07

**COLLINS, E. R.**  
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NPO-14270 878-10324 03

**COLWELL, J. E.**  
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GSFC-12379 878-10595 09

**CONSTABLE, R. C.**  
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M-FS-23838 878-10154 01

**CONWAY, E. J.**  
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**COSTOGUE, E. N.**  
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NPO-13652 878-10186 03

**COUCH, L. M.**  
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**CRAWFORD, M. E.**  
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LEWIS-13009 878-10260 06

**CRECELIUS, W.**  
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LEWIS-12761 878-10263 06

**CROCKETT, L. K.**  
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MSC-16605 878-10089 06

**CROOM, D. R.**  
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LANGLEY-12034 878-10272 07

**CROUCH, C. E.**  
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M-FS-23725 878-10344 04

**CROVELLA, E. A.**  
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MSC-16048 878-10412 07

**CRUZAN, R. C.**  
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MSC-16972 878-10570 07

**CUDDIHY, E. F.**  
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**CULLER, V. H.**  
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**CULOTTA, R.**  
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**CULP, J. D.**  
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**CUMMINS, R. D.**  
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**CUNNINGHAM, D. C.**  
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**CURCIO, P. J.**  
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MSC-18246 878-10411 07

**CURREN, A. N.**  
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**CURRIE, J. R.**  
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**CYGNAROWICZ, T. A.**  
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**DALTON, H. P.**  
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**DAMIAN, J. R.**  
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**DANIELS, C. M., JR.**  
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- DAVIS, T. M.**  
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- DEAN, W. T.**  
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MSC-16864 B78-10219 04
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Standardized gas-temperature probes  
LEWIS-13059 B78-10392 06
- GOLD, H.**  
Stable hydraulic pressure regulator  
LEWIS-13058 B78-10417 07
- GOLDSTEIN, R. M.**  
Optical gyroscope  
NPO-14258 B78-10176 03
- GOLDSTEIN, R. M.**  
Automatic acquisition and ranging system  
NPO-13982 B78-10312 02
- GOLDSTEIN, R. M.**  
Measuring radio-signal power accurately  
NPO-13373 B78-10464 02
- GORDON, L. H.**  
Electrolysis cell stimulation  
LEWIS-12740 B78-10179 03
- GOSS, W. C.**  
Optical gyroscope  
NPO-14258 B78-10176 03
- GRAEBNER, E. C.**  
Control of dielectric film deposition  
LEWIS-13092 B78-10430 08
- GRANDLE, R. E.**  
Phase-shift array, arbitrary and continuous through 360 deg  
LANGLEY-12272 B78-10308 01
- GRAY, N. C.**  
Penetrating fire extinguisher  
KSC-11064 B78-10397 06
- GREENLEAF, J. E.**  
Sweat collection capsule  
ARC-11031 B78-10367 05
- GRIFFITH, J. S.**  
Improved conical solar concentrator  
NPO-13825 B78-10187 03
- GRIMES, H. H.**  
Ultra-high-strength boron fibers  
LEWIS-12739 B78-10051 04
- GROSS, C.**  
Electronically-scanned pressure measurement system  
LANGLEY-12386 B78-10394 06
- GROSS, C.**  
High-sampling-rate pressure transducer has in situ calibration  
LANGLEY-12230 B78-10536 06
- GROSSBARD, H.**  
Reclaiming hybrid integrated circuits  
MSC-16463 B78-10129 08
- GRUNBAUM, B. W.**  
Improvements in microelectrophoresis apparatus  
ARC-11121 B78-10247 05

**GUEST, J. W.**

Compact pressure-line coupling  
MSC-16893 B78-10099 07

**GUIDRY, L. I.**

Analysis of beam columns  
MSC-18009 B78-10402 06

**GUM, G. R.**

Free-air content in fluid systems  
MSC-16703 B78-10251 06

**GUNTHER, W. D.**

'Pseudobackscatter' laser velocimeter  
ARC-10970 B78-10318 03

**GUPTA, K. K.**

Analysis of linear viscoelastic structures  
NPO-13197 B78-10266 06

**GUSTAFSON, J. A.**

Quick-and-easy shear-load testing  
MSC-16765 B78-10073 06

**GYORGAK, C. A.**

Low-chromium stainless steels  
LEWIS-12543 B78-10046 04

**H****HAACK, R. F.**

Multiple-sample holder for IC testing  
NPO-14314 B78-10540 06

**HABEN, R. L.**

Topping pressure for gas-storage  
cylinders  
MSC-18186 B78-10542 06

**HADEK, V.**

Antistatic coating for acrylics  
NPO-13867 B78-10509 04

**HAEUSSERMANN, W.**

Hall devices improve electric motor  
efficiency  
M-FS-23828 B78-10303 01

**HALE, G. L.**

Fabrication of sea-floor models  
NPO-13554 B78-10295 09

**HALL, J. R.**

Infrared-enhanced TV for fire detection  
M-FS-19380 B78-10172 03

**HALLBERG, F.**

Precision cleaver for 'soft' crystals  
GSFC-12291 B78-10348 04

**HAMILTON, B. J.**

Noncontact optical communication  
between moving stations  
LANGLEY-12283 B78-10377 06

**HAMMONS, R. E.**

Simplified tooling for spray masking  
MSC-16927 B78-10136 08

**HAMROCK, B. J.**

Self-centering stepped piston  
LEWIS-12997 B78-10101 07  
Elastic deformation of ball bearings,  
gears, and cams  
LEWIS-13076 B78-10544 06

**HARDIN, J. C.**

Noise calculation on the basis of vortex  
flow models  
LANGLEY-12271 B78-10078 06

**HARF, F. H.**

Wrought nickel-base superalloy  
LEWIS-12844 B78-10045 04

**HARRIS, W. J.**

Measurement of subcoat thickness by  
characteristic x-rays  
MSC-16718 B78-10505 04

**HARSTAD, A. J.**

Application of solar energy to  
air-conditioning  
M-FS-23913 B78-10215 03

**HATCH, A.**

Automated control of crystal growth  
NPO-14420 B78-10582 08

**HAW, D. W.**

Modified pipe extension safely releases  
chain binders  
MSC-16937 B78-10103 07

**HAWKINSON, E. L.**

Insulator for cryogenic joints  
M-FS-19361 B78-10419 07

**HAYNES, B. W.**

Bacillus cereus strain MCN as a debriding  
agent  
LANGLEY-12287 B78-10067 05

**HAYNIE, C. C.**

Tile-bonding tool  
KSC-11053 B78-10134 08

Adhesive-removal tool

MSC-19498 B78-10279 07

Holding fixture for variable-contour  
parts  
MSC-16270 B78-10429 08

**HEER, E.**

Analysis of linear viscoelastic structures  
NPO-13197 B78-10266 06

**HEIER, W. C.**

Wrench for thin-walled cylinders  
LANGLEY-12286 B78-10579 07

**HEISMAN, R. M.**

Rapid leak detection with liquid  
crystals  
MSC-13804 B78-10084 06

Thermal-leak analyzer for  
vacuum-jacketed lines  
MSC-16802 B78-10085 06

High-temperature brazing of stainless  
steel  
MSC-19459 B78-10112 08

Process fabricates flat panels at high  
temperatures  
MSC-16969 B78-10116 08

Laser wire stripping  
MSC-18000 B78-10118 08

A sharp knife for high temperatures  
MSC-16932 B78-10278 07

**HENDRICKS, R. C.**

Graphics program for charts  
LEWIS-12811 B78-10598 09

**HENKE, D.**

Scale parachute fabrication  
M-FS-23139 B78-10141 08

**HERSHEY, L. M.**

Simplified phase detector  
NPO-13395 B78-10457 01

**HEYMAN, J. S.**

Pseudo-continuous-wave acoustic  
instrument  
LANGLEY-12260 B78-10248 06

A solid-state phase-insensitive ultrasonic  
transducer  
LANGLEY-12304 B78-10385 06

**HICKMAN, D. M.**

Noncontacting electrokinetography  
system  
MSC-18162 B78-10533 05

**HILLMAN, J. J.**

Thermal compensator for helium  
refrigerators  
GSFC-12168 B78-10082 06

**HIPKINS, K. R.**

Medical Information Management  
System  
GSFC-12078 B78-10376 05

**HIRSCHBERG, J. G.**

Compact turbidity meter  
KSC-11063 B78-10545 06

**HOFFMAN, H. C.**

Improved notation controller  
GSFC-12273 B78-10383 06

**HOLANDA, R.**

Standardized gas-temperature probes  
LEWIS-13059 B78-10392 06

**HOLCOMB, J. M.**

Automated electrophoresis apparatus  
M-FS-23983 B78-10516 04

**HOLLAND, L. R.**

Zone-refining encapsulated  
semiconductors  
M-FS-23902 B78-10351 04

**HOLLENBAUGH, R. P.**

Compression testing of flammable  
liquids  
MSC-16121 B78-10548 06

**HOLT, J. W.**

Tile-bonding tool  
KSC-11053 B78-10134 08

**HOLZMAN, R. E.**

Processor for the UNIVAC 1100 series  
NPO-13469 B78-10600 09

**HOPKINS, P. M.**

Chopper-stabilized phase detector  
MSC-16461 B78-10163 02

**HOSIER, R. N.**

Predicting rotor rotation noise  
LANGLEY-12098 B78-10406 06

**HOUGE, J. C.**

resterilizable electrode for  
electrosurgery  
HQN-10915 B78-10370 05

**HOUSEMAN, J.**

Boosting the power of two-stage  
engines  
NPO-14057 B78-10105 07

**HOWER, P. L.**

High-Speed, high-power, switching  
transistor  
LEWIS-13021 B78-10298 01

**HSU, G. C.**

Coal desulfurization with iron  
pentacarbonyl  
NPO-14272 B78-10342 04

Chemical-vapor deposition of silicon from  
silane  
NPO-14403 B78-10502 03

Model of silicon production in a  
fluidized-bed reactor  
NPO-14404 B78-10520 04

**HUBBARD, W. P.**

Automatic acquisition and ranging  
system  
NPO-13982 B78-10312 02

**HUDSON, W. R.**

Ion-beam texturing of materials  
LEWIS-12996 B78-10357 04

Ion-beam-textured graphite  
LEWIS-12724 B78-10506 04

**HUEY, D. C.**

Bit-synchronizer lock detector  
MSC-16744 B78-10164 02

**HUMPHRIES, T. S.**

Corrosion inhibitors for solar-heating and  
cooling  
M-FS-25023 B78-10501 03

**HUMPHRIES, W. R.**

Solar simulator test facility  
M-FS-23972 B78-10477 03

**HUNTER, W. W., JR.**

Miniature velocimeter  
LANGLEY-12281 B78-10539 06

## I

- ICELAND, W. F.**  
 Rapid leak detection with liquid crystals  
 MSC-13804 878-10084 06  
 Thermal-leak analyzer for  
 vacuum-jacketed lines  
 MSC-16802 878-10085 06  
 Laser wire stripping  
 MSC-18000 878-10118 08  
 A sharp knife for high temperatures  
 MSC-16932 878-10278 07
- IGNACZAK, L. R.**  
 Portable spark-gap arc generator  
 LEWIS-12886 878-10008 01
- INGHAM, J. D.**  
 Fire-and smoke-retardant polyesters and  
 elastomers  
 NPO-14053 878-10058 04  
 Low-temperature elastomer production  
 and curing  
 NPO-13899 878-10346 04
- IPRI, A. C.**  
 Analyzing CMOS/SOS fabrication for LSI  
 arrays  
 M-FS-23788 878-10158 01
- ITRI, B. A.**  
 Bit-synchronizer lock detector  
 MSC-16744 878-10164 02
- IZU, Y. D.**  
 High-temperature waterproofing for  
 tiles  
 MSC-16773 878-10135 08

## J

- JACK, J. R.**  
 Energy conservation, using remote  
 thermal scanning  
 LEWIS-12812 878-10178 03
- JACKSON, L. R.**  
 High-strength blind rivet  
 LANGLEY-12154 878-10287 08
- JANSEN, J. F.**  
 Slurry-powder sintering furnace  
 LANGLEY-11423 878-10293 08
- JASMIN, J. P.**  
 Preventing radio-paging system tieup  
 MSC-19696 878-10024 02
- JASON, A.**  
 Absorptive coating for aluminum solar  
 panels  
 M-FS-25033 878-10507 04
- JASON, N. H.**  
 Directory of fire research specialists  
 LEWIS-13123 878-10399 06
- JAY, C. G.**  
 Hydrogen enrichment of synthetic fuel  
 M-FS-23279 878-10039 04
- JAYROE, R. R., JR.**  
 Multidimensional histograms  
 M-FS-23855 878-10503 03
- JEFFERS, E. L.**  
 Rapid measurement of bacteria in  
 water  
 GSFC-12158 878-10232 05  
 Monitoring systems for community water  
 supplies  
 MSC-16778 878-10233 05  
 Automated electrochemical selection of  
 coliforms  
 MSC-16777 878-10236 05  
 Chemiluminescence and  
 bioluminescence microbe detection  
 MSC-16779 878-10237 05

- JENKIN, K. R.**  
 Helicopter position stabilizing system  
 LANGLEY-11670 878-10256 06
- JENNINGS, D. E.**  
 Thermal compensator for helium  
 refrigerators  
 GSFC-12168 878-10082 06  
 Vibration-free thermal link  
 GSFC-12297 878-10169 03
- JEZEK, D. I.**  
 Mounting procedure for geological  
 samples  
 MSC-18206 878-10327 03
- JOHNSON, E. T.**  
 Automated chromosome analysis  
 NPO-13913 878-10364 05
- JOHNSON, R. L.**  
 Gas-path seal material  
 LEWIS-12623 878-10347 04
- JOHNSON, W. H.**  
 'Space slitter' for film or tape  
 KSC-10894 878-10138 08
- JOHNSTON, A. R.**  
 Optical traffic-sensing concept  
 NPO-13603 878-10021 02
- JONES, E. W.**  
 Improved nucleonic coal-thickness  
 monitor  
 M-FS-23725 878-10344 04
- JONES, J. S.**  
 Testing composite sheets at high  
 temperatures  
 MSC-16237 878-10252 06
- JONES, R. L.**  
 Power-switch dV/dt sensing  
 MSC-16707 878-10307 01
- JORDAN, J. E.**  
 Measuring projectile speed  
 LANGLEY-12387 878-10538 06
- JOSEPH, G. M.**  
 Pneumatic servomechanisms  
 M-FS-23295 878-10144 08
- JUANARENA, D. B.**  
 Electronically-scanned pressure  
 measurement system  
 LANGLEY-12386 878-10394 06
- JUE, S.**  
 Temperature-gradient oven  
 M-FS-23919 878-10390 06
- JUNOD, T. L.**  
 Toxic substances handbook  
 LEWIS-13124 878-10359 04  
 Directory of fire research specialists  
 LEWIS-13123 878-10399 06

## K

- KAELEBLE, D. H.**  
 Biocompatibility of surgical implants  
 NPO-14291 878-10368 05
- KALVINSKAS, J. J.**  
 Microbial desulfurization of coal  
 NPO-14227 878-10038 04
- KAMDAR, M. H.**  
 Hydrogen embrittlement of nickel  
 ARC-10966 878-10231 04
- KAMINSKY, R.**  
 Temperature stabilization of microwave  
 ferrite devices  
 MSC-16833 878-10152 01
- KAMMERER, C. C.**  
 Low-cost ultrasonic lamb-wave  
 transducer  
 MSC-16333 878-10072 06

- Corrosion detection and evaluation  
 M-FS-24436 878-10227 04
- KAN, E. P.**  
 Postprocessing classification images  
 MSC-18238 878-10601 09
- KANE, J. O.**  
 Metallic thermal seal  
 MSC-18135 878-10566 07
- KANTSIOS, A. G.**  
 Infrared scanners for temperature  
 measurement in wind tunnels  
 LANGLEY-12171 878-10077 06  
 Infrared scanners detect thermal  
 gradients in building walls  
 LANGLEY-12157 878-10480 03
- KAPUR, V. K.**  
 Low-cost high purity production  
 NPO-14198 878-10050 04
- KARNS, J. R.**  
 Dual relief-valve system  
 LANGLEY-12267 878-10111 07
- KASSEL, P. C., JR.**  
 Measuring projectile speed  
 LANGLEY-12387 878-10538 06
- KASTNER, S. O.**  
 Diffractoid x-ray focusing  
 GSFC-12357 878-10487 03
- KATSANIS, T.**  
 Flow velocities and streamlines  
 LEWIS-12966 878-10094 06
- KAUFMAN, J. W.**  
 Wind-wheel electric power generator  
 M-FS-23515 878-10268 07
- KAUPPI, J. F.**  
 Combination force and angular-deflection  
 indicator  
 MSC-16155 878-10070 06
- KAYS, W. M.**  
 Internal and external 2-d boundary layer  
 flows  
 LEWIS-13009 878-10260 06
- KEIR, A. R.**  
 Laser wire stripping  
 MSC-18000 878-10118 08
- KEISTER, F. Z.**  
 Shock during PIND test frees particles  
 M-FS-23829 878-10389 06
- KELSO, R. M.**  
 Thermoelectrically-cooled  
 erature probe  
 MSC-18192 878-10484 03
- KENT, W. B.**  
 Wrought nickel-base superalloy  
 LEWIS-12844 878-10045 04
- KIM, K.**  
 Model of silicon production in a  
 fluidized-bed reactor  
 NPO-14404 878-10520 04
- KISSIAH, A. M., JR.**  
 Implantable digital hearing aid  
 KSC-11009 878-10373 05
- KIZER, F.**  
 Curve tracer checks CMOS IC's  
 GSFC-12209 878-10007 01
- KLEMM, R. E.**  
 Custom blending of lamp phosphors  
 MSC-16692 878-10056 04
- KLIMA, S. J.**  
 Ultrasonic evaluation of high-voltage  
 circuit boards  
 LEWIS-12781 878-10087 06
- KNUDSEN, A. W.**  
 Nacelle incremental drag  
 LEWIS-12786 878-10400 06
- KOEPP, G. A.**  
 Common-cavity pumped laser  
 GSFC-12237 878-10320 03

**KOLYER, J. M.**

- Universal test fixture for solar cells  
NPO-14062 B78-10184 03  
Accelerated-weathering test-system for  
solar cells  
NPO-14061 B78-10185 03

**KOPP, G. F.**

- Three-function signal generator  
MSC-16672 B78-10306 01

**KOURTIDES, D. A.**

- Heat resistant nontoxic laminate  
ARC-11040 B78-10356 04

**KRAUSE, L. N.**

- Thermocouples measure very-hot gas  
temperatures  
LEWIS-12843 B78-10076 06  
Standardized gas-temperature probes  
LEWIS-13059 B78-10392 06

**KRUPNICK, A. C.**

- Natural-oxide solar-collector coatings  
M-FS-23518 B78-10326 03

**KUBACKI, R. M.**

- Boron trifluoride coatings for plastics  
ARC-11057 B78-10043 04  
Scratch resistant plastic lenses  
ARC-11039 B78-10519 04

**KUHLMAN, E. A.**

- Compact antenna has symmetrical  
radiation pattern  
ARC-11189 B78-10473 02

**KULESZ, J. J.**

- Predicting damage from exploding  
vessels  
LEWIS-13042 B78-10258 06

**KUZNETZ, L. H.**

- Automated controller for liquid-cooled  
garments  
MSC-18055 B78-10365 05

**L****LADANY, I.**

- Protective coating for laser diodes  
LANGLEY-11746 B78-10171 03

**LAGER, J. R.**

- Low-cost graphite/epoxy structural  
panels  
M-FS-23871 B78-10427 08

**LAN, C. E.**

- Wing aerodynamics under blowing jets  
LANGLEY-12256 B78-10401 06

**LANGSTON, J. L.**

- Simple digital pulse-programming circuit  
NPO-13747 B78-10299 01

**LARUE, H. C.**

- Tool simplifies weld preparation of  
aluminum  
MSC-16992 B78-10123 08

**LATTA, W. R.**

- Dual relief-valve system  
LANGLEY-12267 B78-10111 07

**LAWSON, A. G.**

- Brazed boron-silicon carbide/aluminum  
structural panels  
LANGLEY-12244 B78-10221 04

**LAWSON, D. D.**

- Fire-and smoke-retardant polyesters and  
elastomers  
NPO-14053 B78-10058 04  
Long-lasting solid-polymer electrolytic  
hygrometer  
NPO-13948 B78-10086 06  
Coal mining with a liquid solvent  
NPO-14028 B78-10345 04

**LAYLAND, J. W.**

- Automatic acquisition and ranging  
system  
NPO-13982 B78-10312 02

**LEAL, J. R.**

- Ultrafine PBI fibers and yarns  
ARC-11221 B78-10504 04

**LECROY, S. R.**

- Ocean-wave ray or crest diagrams in  
shoaling waters  
LANGLEY-12380 B78-10341 03

**LEE, J.**

- Telecommunications network  
optimization  
NPO-14486 B78-10476 02

**LEE, R. W.**

- Retainer for laboratory animals  
LANGLEY-12353 B78-10371 05

**LEECH, R. A.**

- Arc detector uses fiber optics  
NPO-13377 B78-10449 01

**LEONARD, W. D.**

- Verifying the fit of mating contoured  
surfaces  
LANGLEY-11731 B78-10290 08

**LEPISTO, J.**

- Multiplexed battery-bypass control  
system  
NPO-14414 B78-10474 02

**LESCO, D. J.**

- Test-vehicle cycle programmer  
LEWIS-12977 B78-10020 02

**LEVINSON, S.**

- Low-power tuner for lasers  
M-FS-23863 B78-10486 03

**LEVOE, C. E.**

- Fabrication of sea-floor models  
NPO-13554 B78-10295 09

**LEVY, M. E.**

- Testing integrated circuits by  
photoexcitation  
M-FS-23943 B78-10451 01

**LEW, D.**

- Detecting servo failures with software  
FRC-11003 B78-10396 06

**LEWIS, D. I.**

- Processor for the UNIVAC 1100 series  
NPO-13469 B78-10600 09

**LEWIS, G. W.**

- Improved myocardium transducer  
NPO-14107 B78-10372 05

**LICARI, J. J.**

- Sealing microcircuits with adhesives  
M-FS-23869 B78-10592 08

**LIND, W. P.**

- Splicing shielded cables  
MSC-18297 B78-10453 01

**LINDMAYER, J.**

- Thin silicon-solar cell fabrication  
NPO-14047 B78-10325 03

**LINTON, A. T.**

- Monitoring systems for community water  
supplies  
MSC-16778 B78-10233 05  
Data processing for water monitoring  
system  
MSC-16842 B78-10234 05

**LIPOMA, P. C.**

- Video scrambler/descrambler  
MSC-16843 B78-10013 02

**LISKAY, G. G.**

- Match-mold process for foam insulation  
MSC-16631 B78-10126 08  
Void-free foam insulation  
MSC-16805 B78-10127 08  
High-rise foam-in-place process  
MSC-16931 B78-10128 08

**LIU, H.**

- Acoustic-optical imaging without  
immersion  
M-FS-23876 B78-10549 06

**LOCKARD, M. L.**

- Automated temperature-cycling  
apparatus  
LANGLEY-12310 B78-10391 06

**LOEWENTHAL, S. H.**

- Design of transmission shafting  
LEWIS-12965 B78-10107 07

**LOMBARDT, T.**

- CMOS-array design-automation  
techniques  
M-FS-23762 B78-10311 01

**LONG, J. C.**

- Plotting shear-flow forces  
MSC-18013 B78-10445 09  
Plotting max/min data envelopes  
MSC-18016 B78-10597 09

**LOSEY, R.**

- Testing of three hot-air solar collectors  
M-FS-23887 B78-10201 03  
Indoor and outdoor tests of a liquid solar  
collector  
M-FS-23886 B78-10207 03  
Performance of black-nickel and  
black-chrome solar collectors  
M-FS-23888 B78-10210 03

**LOVIN, J. K.**

- Orbital heat rate package  
M-FS-23980 B78-10554 06

**LOWRY, L. R.**

- Gate-assisted turn-off thyristor  
LEWIS-12535 B78-10004 01

**LUCAS, W. G.**

- Extension handle for spray cans  
KSC-11083 B78-10576 07

**LUCY, M. H.**

- Quick-connect threaded attachment  
joint  
LANGLEY-12232 B78-10414 07

**LUDWIG, L. P.**

- Gas-path seal material  
LEWIS-12623 B78-10347 04

**LUTWACK, R.**

- Chemical-vapor deposition of silicon from  
silane  
NPO-14403 B78-10502 03  
Model of silicon production in a  
fluidized-bed reactor  
NPO-14404 B78-10520 04

**LYONS, T. D.**

- Electrical-ground monitor  
MSC-18281 B78-10455 01

**M****MACCONNELL, J. W.**

- Pulse-width-modulated attenuator for  
AGC  
NPO-14127 B78-10459 01

**MACDORAN, P. F.**

- Real-time monitoring of crustal  
deformations  
NPO-14124 B78-10034 03  
Air-traffic surveillance systems  
NPO-14173 B78-10313 02

**MACFARLANE, D. I.**

- Detecting overpenetration of  
electron-beam welds  
M-FS-19396 B78-10586 08

**MAIRS, R. Y.**

- Nacelle incremental drag  
LEWIS-12786 B78-10400 06



- MALCHOW, H. L.**  
Solar-electric geocentric transfer  
LEWIS-12939 B78-10403 06
- MANATT, S. L.**  
Boosting production yield of biomedical peptides  
NPO-14142 B78-10240 05
- MANDEL, G.**  
Directory of fire research specialists  
LEWIS-13123 B78-10399 06
- MANDELKORN, J.**  
Improved method of solar-cell assembly  
LEWIS-12729 B78-10438 08
- MANTON, N. R.**  
Bench-top soldering aid for PC boards  
MSC-16274 B78-10121 08
- MANUS, E. A.**  
Narrow-bandwidth receiver  
GSFC-12142 B78-10463 02
- MARAIA, B. J.**  
Coated-felt thermal insulation  
MSC-12737 B78-10510 04
- MARCUS, B. D.**  
Flat-plate heat pipe  
GSFC-11998 B78-10035 03
- MARGOLIS, J. S.**  
Improved 'spectrophone'  
NPO-14143 B78-10167 03
- MARKE, M. L.**  
Fastener for thermal insulation blankets  
MSC-18253 B78-10571 07
- MARSH, H. E.**  
Predicting structures of cross-linked condensation polymers  
NPO-14007 B78-10352 04
- MARTIN, J. W.**  
Reducing stickiness of elastomer valve seals  
LANGLEY-11778 B78-10565 07
- MARTIN, W. L.**  
Automatic acquisition and ranging system  
NPO-13982 B78-10312 02
- MARTINI, W. R.**  
Stirling-engine design manual  
LEWIS-13098 B78-10580 07
- MASERJIAN, J.**  
Measuring oxide trapping parameters in MOS structure  
NPO-14120 B78-10002 01
- MASSON, R. K.**  
Multichannel VCO needs only one reference  
MSC-18225 B78-10448 01
- MASTANDREA, J. R.**  
Damage-detection system for LNG carriers  
LANGLEY-11463 B78-10250 06
- MASTERS, R. M.**  
Inexpensive, portable, integrating solar energy meter  
LEWIS-12804 B78-10188 03
- MARTIN, C. W.**  
Body-fitted coordinates systems transformations  
LANGLEY-12307 B78-10147 09
- MATSUMOTO, R. T.**  
Improved driver for capacitive loads  
LANGLEY-11609 B78-10304 01
- MAULDIN, D. G.**  
Microprocessor-based cardiopulmonary monitor  
MSC-18235 B78-10369 05
- MAYO, R. F.**  
Automatic bypass valve  
LANGLEY-12063 B78-10558 07
- MCCLURE, S. R.**  
Welding fixture for thin metal parts  
GSFC-12318 B78-10428 08
- MCCOLLUM, W. L.**  
Marshall system for aerospace simulation  
M-FS-22672 B78-10296 09
- MCCREA, F. E.**  
Ruby c-axis alignment system  
NPO-14252 B78-10379 06
- MCDUGAL, A. R.**  
Precision fluid-pressure regulator  
NPO-13370 B78-10106 07
- MCGOUGAN, W. R.**  
Collapsible module extends tenfold in height  
NPO-13371 B78-10280 07
- MCGANNON, W. J.**  
Intraocular pressure reduction and regulation  
LEWIS-12723 B78-10523 05
- MCKEE, E. D.**  
Compact antenna has symmetrical radiation pattern  
ARC-11189 B78-10473 02
- MCKEOWN, D.**  
High-vacuum, low-temperature bond for second-surface mirrors  
M-FS-23405 B78-10124 08
- MCKNIGHT, L. E.**  
Processing high-strength steel alloys  
MSC-16172 B78-10441 08
- MCKOWN, R. D.**  
Two braze alloys for thin-wall components  
M-FS-19206 B78-10117 08
- MCLYMAN, W. T.**  
Improved transformer-winding method  
NPO-14243 B78-10282 08
- MCKOWN, R. D.**  
Bonding core mating surfaces improves transformer  
NPO-13855 B78-10283 08
- MCKOWN, R. D.**  
Precise matching of diodes  
NPO-14293 B78-10452 01
- MCKOWN, R. D.**  
Load balancing multimodule switching power converters  
NPO-13832 B78-10461 01
- MCNALLY, W. D.**  
Flow velocities and streamlines  
LEWIS-12966 B78-10094 06
- MCRONALD, A. D.**  
Improved electron-beam probe for hypersonic flows  
NPO-13793 B78-10254 06
- MENDIRATTA, R. G.**  
Mossbauer studies of bulk and thin-film FeTe  
M-FS-23773 B78-10059 04
- MESSICK, W. R.**  
Quick-connect threaded attachment joint  
LANGLEY-12232 B78-10414 07
- MEYERS, J. F.**  
Miniature velocimeter  
LANGLEY-12281 B78-10539 06
- MEZRICH, R. S.**  
Video method for studying optical fields  
M-FS-23103 B78-10036 03
- MEZZACAPPA, M. A.**  
Computation of spare parts requirements  
MSC-16872 B78-10593 09
- MICKELSEN, R. A.**  
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LEWIS-13078 B78-10398 06
- MIKULAS, M. M., JR.**  
Lattice panels with high structural efficiency  
LANGLEY-11898 B78-10426 08
- MILLER, C. G.**  
Coal mining with a liquid solvent  
NPO-14028 B78-10345 04
- MILLER, D. C.**  
Low-frequency vibration isolation  
NPO-13915 B78-10275 07
- MILLER, R. L.**  
Voice-output solar energy reporter  
LEWIS-12947 B78-10022 02
- MILLET, A. U.**  
Gentle support stands for fluid-line mockups  
MSC-16479 B78-10291 08
- MILLMAN, J. L.**  
Cryostat safety tent  
GSFC-12206 B78-10080 06
- MINER, R. V.**  
Wrought nickel-base superalloy  
LEWIS-12844 B78-10045 04
- MINTON, F. R.**  
Window flaw detection by backscatter lighting  
MSC-16605 B78-10089 06
- MITCHELL, M. J.**  
High-temperature brazing of stainless steel  
MSC-19459 B78-10112 08
- MITCHELL, M. J.**  
Form die and glide plates for vacuum brazing  
MSC-16549 B78-10113 08
- MITCHELL, M. J.**  
Internal grid for release of brazing retorts  
MSC-19472 B78-10114 08
- MITCHELL, M. J.**  
Vacuum control for brazing stainless steel  
MSC-19457 B78-10115 08
- MITCHELL, M. J.**  
Process fabricates flat panels at high temperatures  
MSC-16969 B78-10116 08
- MITCHELL, P. D.**  
Braze boron-silicon carbide/aluminum structural panels  
LANGLEY-12244 B78-10221 04
- MOACANIN, J.**  
Dip-molded t-shaped cannula  
NPO-14073 B78-10062 05
- MONFORD, L.**  
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MSC-16842 B78-10234 05
- MONTANO, J. W.**  
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M-FS-23843 B78-10229 04
- MONTANO, J. W.**  
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M-FS-23844 B78-10230 04
- MOORE, D. M.**  
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NPO-13552 B78-10472 02
- MOORHEAD, P. E.**  
Calibration method for an ultrasonic gray-scale recorder  
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- MOORHEAD, P. E.**  
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LEWIS-12783 B78-10017 02
- MORENC, N. P.**  
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**MORRIS, G. A., JR.**

Wideband digital spectrum analyzer  
NPO-14394 B78-10468 02

**MORRIS, W. D.**

Ocean-wave ray or crest diagrams in  
shoaling waters  
LANGLEY-12380 B78-10341 03

**MOSEMAN, M.**

Fire-and smoke-retardant polyesters and  
elastomers  
NPO-14053 B78-10058 04

**MSU, G. C.**

Low-temperature refining of coal  
NPO-14210 B78-10511 04

**MUELLER, R. L.**

Automated solar-cell-array assembly  
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NPO-13652 B78-10186 03

**MUELLER, W. A.**

Positively charged membrane for urea  
dialysis  
NPO-14101 B78-10241 05

**MUNFORD, J. A.**

Automated inspection of wire-frame  
assemblies  
GSFC-12321 B78-10546 06

**MURPHY, C. R.**

Eliminating gold migration in  
microcircuits  
MSC-18213 B78-10462 01

**N****NAGANO, S.**

Synchronous transfer circuits for  
redundant systems  
NPO-14162 B78-10157 01

Automatic load sharing in inverter  
modules  
NPO-14056 B78-10302 01

Overload protection system  
NPO-13872 B78-10460 01

**NALEPKA, R. F.**

Predicting crop production from satellite  
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GSFC-12379 B78-10595 09

**NARASIMHAN, K. Y.**

Pulse-echo probe of rock permeability  
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NPO-14192 B78-10222 04

**NARAYANASWAMI, R.**

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LANGLEY-12064 B78-10594 09

**NASH, J. M.**

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**NEAD, M. W.**

A parameter-estimation subroutine  
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**NEARY, J. K.**

Quick-and-easy shear-load testing  
MSC-16765 B78-10073 06

**NEASE, A. W.**

Hydraulic dynamic analysis  
MSC-16795 B78-10095 06

**NEFF, M. A.**

High-gradient continuous-casting  
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LEWIS-12934 B78-10425 08

**NELSON, D. J.**

Hydraulic dynamic analysis  
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High-temperature capacitive pressure  
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**NEWTON, J. W.**

Measuring radio-signal power  
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**NICHOLS, R. L.**

Glass solar collector - materials  
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**NORBURY, D. A.**

Miniature Ku-Band down converter  
MSC-18313 B78-10450 01

**NORRIS, D. A.**

Vacuum leadthrough for hydrogen  
maser  
NPO-14148 B78-10422 07

**NORWOOD, L. B.**

Contouring pile-brush seals  
MSC-16231 B78-10588 08

**NUGENT, J.**

Shock-swallowing air sensor  
FRC-10107 B78-10537 06

**NYLAND, T. W.**

Simple air-piston gas-sampling system  
LEWIS-12922 B78-10110 07

**O****OBRIEN, D. E., III**

Efficient digital encoding scheme  
MSC-18267 B78-10467 02

**OCHELTREE, S. L.**

Miniature velocimeter  
LANGLEY-12281 B78-10539 06

**OFARRELL, K.**

Circuit-lead trimming template  
MSC-16589 B78-10439 08

**OHU, C. K.**

High-Speed, high-power, switching  
transistor  
LEWIS-13021 B78-10298 01

**OKAMOTO, G.**

Quick locking/unlocking retainer  
MSC-18048 B78-10408 07

**OLLENDORF, S.**

Thermal-control canister  
GSFC-12253 B78-10079 06

**OLOHAM, G. A.**

Predicting damage from exploding  
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LEWIS-13042 B78-10258 06

**OLSSON, D. L.**

Coaxial isolator has versatile interface  
MSC-16908 B78-10009 01

**ORR, D. H.**

Simulator for training  
remote-manipulator operators  
MSC-14921 B78-10415 07

**OSTROFF, A. J.**

Approach and landing simulation  
LANGLEY-12060 B78-10091 06

**OTTH, D. H.**

Low-frequency vibration isolation  
NPO-13915 B78-10275 07

**OWEN, R. B.**

Measuring surface displacements  
optically  
M-FS-23861 B78-10321 03

**OWENS, G.**

Easily installed insulation for  
steamfittings  
MSC-18277 B78-10589 08

**OWENS, L. J.**

Ocean thermal plant  
KSC-11034 B78-10482 03

**P****PACKARD, C. A.**

Multipurpose system simulator  
GSFC-12333 B78-10444 09

**PACKER, P. N.**

Holding fixture for variable-contour  
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MSC-16270 B78-10429 08

**PADILLA, D.**

Low-cost graphite/epoxy structural  
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M-FS-23871 B78-10427 08

**PAGE, D. J.**

Gate-assisted turn-off thyristor  
LEWIS-12535 B78-10004 01

**PARK, J. J.**

New adhesive withstands temperature  
extremes  
GSFC-12345 B78-10042 04

**PARKER, J. A.**

Heat resistant nontoxic laminate  
ARC-11040 B78-10356 04

**PARKER, L. W.**

Power loss for high-voltage solar-cell  
arrays  
LEWIS-12865 B78-10340 03

**PARR, A.**

Absorptive coating for aluminum solar  
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M-FS-25033 B78-10507 04

**PARR, V. B.**

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LEWIS-13042 B78-10258 06

**PARTHASARATHY, S. P.**

Pulse-echo probe of rock permeability  
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NPO-14192 B78-10222 04

**PATEL, B. C.**

Installing fiber insulation in tight spaces  
MSC-16934 B78-10289 08

**PAULIN, R. E.**

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MSC-18015 B78-10446 09

**PAULKOVICH, J.**

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GSFC-12361 B78-10483 03

**PAYNE, B. J.**

Testing composite sheets at high  
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MSC-16237 B78-10252 06

**PECHMAN, A.**

Accelerated purification of colloidal silica  
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MSC-16793 B78-10512 04

**PECK, S. R.**

Low partial discharge vacuum  
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GSFC-12347 B78-10559 07

**PELCHAT, G. M.**

Adaptive polarization separation  
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**PERKINS, K. L.**

Sealing microcircuits with adhesives  
M-FS-23869 B78-10592 08

**PERLMAN, M.**

Detecting and correcting bit errors on magnetic tape  
NPO-13842 878-10294 09

**PERRY, J. C.**

Determining the response of an FM receiver  
MSC-16751 878-10465 02

**PERSON, J. K.**

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NPO-13652 878-10186 03

**PHILLIPS, B. R.**

Electrolysis cell stimulation  
LEWIS-12740 878-10179 03

**PHILLIPS, E. C., JR.**

Improved heat-pipe wick  
NPO-13391 878-10381 06

**PICCILO, G. L.**

Rapid measurement of bacteria in water  
GSFC-12158 878-10232 05  
Chemiluminescence and  
bioluminescence microbe detection  
MSC-16779 878-10237 05

**PILKEY, W. D.**

Performance optimizing  
LANGLEY-11930 878-10096 06

**PINCKNEY, S. Z.**

Static-pressure probe for small geometries  
LANGLEY-11552 878-10395 06

**POEL, G. D.**

Monitoring systems for community water supplies  
MSC-16778 878-10233 05

**POLLOCK, G. E.**

Porous bead packings for gas chromatography  
ARC-11222 878-10518 04

**POOLE, L. R.**

Ocean-wave ray or crest diagrams in shoaling waters  
LANGLEY-12380 878-10341 03

**POORMAN, R.**

Reducing weld peaking in aluminum  
M-FS-23973 878-10433 08

**POSEY, D. L.**

Orifice calibration module  
LANGLEY-12269 878-10393 06

**POUZAR, J. E.**

Easily installed insulation for steamfittings  
MSC-18277 878-10589 08

**POWELL, H.**

Response of graphite/epoxy composites to moisture  
MSC-16899 878-10228 04

**POWER, J. L.**

Electroplating and stripping copper on molybdenum and niobium  
LEWIS-12151 878-10055 04

**PRATURI, A. K.**

Chemical-vapor deposition of silicon from silane  
NPO-14403 878-10502 03

Model of silicon production in a fluidized-bed reactor  
NPO-14404 878-10520 04

**PURGOLD, G. C.**

Automated syringe sampler  
LANGLEY-12308 878-10374 05

**PUSCH, R. M.**

Special weave for insulating fabrics  
MSC-16380 878-10288 08

**Q****QUAM, R.**

Detecting servo failures with software  
FRC-11003 878-10396 06

**QUINN, K. L.**

Miniature thermocouple disconnect  
LANGLEY-12013 878-10535 06

**QUINN, R. A.**

Measurement of subcoat thickness by characteristic x-rays  
MSC-16718 878-10505 04

**R****RADICS, C. C.**

Process for growing thin polished silicon sheets  
NPO-14172 878-10434 08

**RAMAKRISHNAN, R.**

Predicting rotor rotation noise  
LANGLEY-12098 878-10406 06

**RANDALL, D.**

Predicting rotor rotation noise  
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**RASSWEILER, G. G.**

Adaptive polarization separation experiments  
LANGLEY-12196 878-10006 01

**RATHZ, T. J.**

Interactive data-processing system for metallurgy  
M-FS-23774 878-10217 04

**RAY, A. J., JR.**

Z-axis control loop for cathode-ray tubes  
NPO-13775 878-10305 01

**REED, I. S.**

Representation of multivalued logic functions  
NPO-13760 878-10596 09

**REED, M. W.**

Film adhesive enhances neutron radiographic images  
MSC-18061 878-10081 06

Inspection of adhesive-bonded radiators  
MSC-18062 878-10125 08

Selection standard for FEP films for solar energy  
MSC-16999 878-10190 03

Breather cloth for vacuum curing  
MSC-18063 878-10440 08

**REINHARDT, V.**

Femtosecond time-domain phase comparator  
GSFC-12228 878-10162 02

Hydrogen-maser frequency standard  
GSFC-12334 878-10490 03

**REIMBAUM, A.**

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NPO-13946 878-10068 05

Antistatic coating for acrylics  
NPO-13867 878-10509 04

**RENNER, R. E.**

Fabrication of sea-floor models  
NPO-13554 878-10295 09

**RENNIE, P. A.**

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**RHEIN, R. A.**

Low-temperature elastomer production and curing  
NPO-13899 878-10346 04

**RHIM, W.**

Pulsed NMR spectroscopy  
NPO-14023 878-10175 03

**RHODES, M. D.**

Lattice panels with high structural efficiency  
LANGLEY-11898 878-10426 08

**RICCITIELLO, S. R.**

Fire-retardant covering for small containers  
ARC-11104 878-10354 04

Improved imide polymerization catalyst  
ARC-11107 878-10517 04

**RICE, D. T.**

Predicting crop production from satellite data  
GSFC-12379 878-10595 09

**RICE, R. F.**

Simplified data compressor  
NPO-14041 878-10023 02

**RICE, S. W.**

Void-free bends in laminated structures  
MSC-16998 878-10285 08

**RICE, W. J.**

Fast differential analog-to-digital conversion  
LEWIS-12909 878-10149 01

Real-time instrument averages 100 data sets  
LEWIS-13093 878-10534 06

**RICARDS, R. R.**

NO<sub>2</sub> measurement by chemiluminescence  
LANGLEY-11378 878-10386 06

**RICMOND, R. G.**

Thermoelectrically-cooled erature probe  
MSC-18192 878-10484 03

**RICKER, R. E.**

Predicting damage from exploding vessels  
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**RICKINSON, B. A.**

High-gradient continuous-casting furnace  
LEWIS-12934 878-10425 08

**RILEY, T. J.**

Ultrasonic evaluation of high-voltage circuit boards  
LEWIS-12781 878-10087 06

Control of dielectric film deposition  
LEWIS-13092 878-10430 08

**RINARD, G. A.**

Hand-held vital-signals monitor  
MSC-18232 878-10524 05

Hybrid temperature-monitoring circuit  
MSC-18231 878-10525 05

Hybrid ECG signal conditioner  
MSC-18230 878-10526 05

Hybrid respiration-signal conditioner  
MSC-18226 878-10527 05

Hybrid heart/breath-rate processor  
MSC-18227 878-10528 05

Hybrid LCD driver  
MSC-18229 878-10529 05

Hybrid clock generator  
MSC-18228 878-10530 05

**ROBERTS, M. L.**

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M-FS-23518 878-10326 03

**ROBINSON, W. W.**

Microcircuit-cleaning machine  
MSC-16060 878-10292 08

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- ROBSON, J. R.**  
Detecting surface deformations  
photographically  
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- ROGOWSKI, R. S.**  
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- ROSATINO, S. A.**  
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- ROSE, S. D.**  
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- ROSENGREN, L.**  
Low-background trace-gas detector  
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- ROSENTHAL, C.**  
Nylon screws make inexpensive coil  
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- ROSS, D. S.**  
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- ROTTA, J. W., JR.**  
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- ROYSTER, D. M.**  
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- RUBIN, L.**  
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- RUDMANN, A. A.**  
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- RUMENAPP, H. E.**  
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- RUMMEL, J. A.**  
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- RUPPE, E. P.**  
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- RYASON, P. R.**  
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- SANDEFUR, P. G., JR.**  
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- SANTEN, R. W.**  
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- SAPP, J. W., JR.**  
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- SARBOLOUKI, M. N.**  
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- SAUER, R. L.**  
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- SAWIN, C. F.**  
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- SCHAEFFER, G. J.**  
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- SCHANSMAN, R. R.**  
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- SCHAPPACHER, J. B.**  
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- SCHIEDER, H. W.**  
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- SCHERB, M. V.**  
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- SCHLEGEL, E. S.**  
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- SCHROFF, R. A.**  
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- SCHUMANN, L. F.**  
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- SCHUTT, J.**  
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- SCHWIND, F. A.**  
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- SCOTT, D. G.**  
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- SEIDENBERG, B.**  
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- SEIGER, H. N.**  
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- SEVART, F. D.**  
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- SHAI, M. C.**  
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